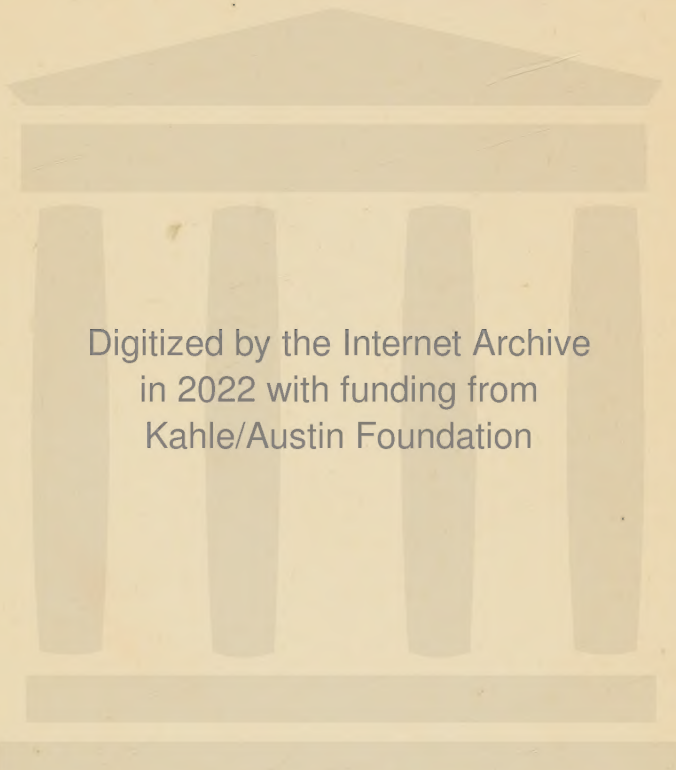




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BRITISH WEEDS

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WITHDRAWN









HOARY PEPPERWORT IN FRUIT.  
(Inset: Single fruit enlarged.)

# BRITISH WEEDS

## THEIR IDENTIFICATION AND CONTROL

A PRACTICAL HANDBOOK FOR THE USE OF ESTATE  
OWNERS, FARMERS, GARDENERS, AND STUDENTS OF  
AGRICULTURE, HORTICULTURE  
AND FIELD BOTANY.

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LONDON: ERNEST BENN, LIMITED  
8 BOUVERIE STREET, E.C. 4

1925

*Printed in Great Britain by  
The Dunedin Press Limited, Edinburgh.*



## PREFACE

Our chief aim in the preparation of this book has been to provide a concise and accurate guide to the identification and control of British Weeds. Other books on the same subject have been published from time to time, but we believe that the present volume is unique in at least five important features, namely :

(1) The arrangement of the weeds in alphabetical order according to the habitats in which they are usually found.

(2) The systematic and orderly description of each species, in non-technical language.

(3) The provision of an original and simple key to the identification of the plants described, constructed expressly for the use of readers having no knowledge of botany.

(4) The ease and simplicity of reference secured by the alphabetical arrangement and the Indexes.

(5) The comprehensive nature of the contents, and the most up-to-date methods of control.

We do not, of course, claim that the Book deals exhaustively with its subject. It was our special desire that its sphere of usefulness should not be limited by a prohibitive price, and this fact alone necessitated not only that much matter of interest be omitted, but also that that which was included be put in the shortest possible form.

The studies, however, of which this volume is the outcome, have not been hastily carried out. Our investigations and experiments began at least fifteen years ago, and have been worked at continuously in various parts of the country since that time. In the pages that follow we have endeavoured to set out such matter as appeared to us to be of the widest general interest and the greatest practical use, not only to estate owners and farmers, but also to gardeners, and to agricultural and horticultural students generally. The study of weeds, however, is essentially a progressive one, and we shall welcome any criticisms or suggestions of a practical nature which will assist us in making future editions, should they be called for, of wider appeal or greater utility.

It is one of the keynotes of this Book that some knowledge of the habits and life-history of a weed is essential if we would deal with the pest to best advantage. The days of haphazard weed-destruction are rapidly coming to a close, and to hasten this end we have thought it wise to give not only a systematic description of every plant dealt with, but also to indicate its usual duration of life. We believe that knowledge of this kind will be of material assistance in estimating the comparative seriousness of the various weeds, and will serve also to indicate the amount of effort that it would be well to expend upon them in the early stages of attack.

In addition to our own original work, however, we have not hesitated to profit, when necessary, by drawing upon the researches of others in similar spheres of activity, and express with pleasure our indebtedness to Dr. Winifred E. Brenchley, F.L.S., and Mr. Harold C. Long, B.Sc., whose writings we have freely consulted, and also to the Ministry of Agriculture for help most generously given.

The half-tone Plates have been made from a series of photographs taken by ourselves specially to illustrate such aspects in the life-history of certain common plants as have a direct bearing upon the general principles of weed control.

To Miss Doris Meyer our thanks are warmly extended for her careful and accurate line drawings of our specimens. The whole of these have been done expressly for the present work, and cannot but add considerably both to its appearance and its usefulness.

RICHARD MORSE.  
RAY PALMER.

*February 1925.*

# CONTENTS

## PART ONE.

	PAGE
CHAPTER 1.	
HOW WEEDS ARE PROPAGATED AND DISPERSED . . . . .	11
CHAPTER 2.	
GENERAL METHODS OF WEED CONTROL . . . . .	15
CHAPTER 3.	
ALIEN WEEDS . . . . .	20
CHAPTER 4.	
THE IDENTIFICATION OF WEEDS . . . . .	23

## PART TWO.

INTRODUCTORY NOTE . . . . .	43
SECTION I.	
WEEDS OF ARABLE LAND . . . . .	45
SECTION II.	
WEEDS OF MEADOWS AND PASTURES . . . . .	114
SECTION III.	
WEEDS OF LAWNS, GOLF GREENS, GARDEN PATHS, ETC. . . . .	154
SECTION IV.	
WEEDS OF PONDS, LAKES AND WATER COURSES . . . . .	164

## APPENDICES.

1. WEEDS OF ECONOMIC USE . . . . .	181
2. WEEDS WITH POISONOUS OR INJURIOUS PROPERTIES LIKELY TO AFFECT ANIMALS . . . . .	183
3. WEEDS WHICH SERVE AS HOST PLANTS FOR INSECT PESTS AND FUNGOID DISEASES . . . . .	184
4. INSECT PESTS AND FUNGOID DISEASES ENCOURAGED BY WEEDS . . . . .	185
5. INJURIOUS WEEDS SCHEDULED BY THE MINISTRY OF AGRICULTURE UNDER THE AGRICULTURE ACT AND THE SEEDS ACT . . . . .	186
6. NOTES ON CHEMICAL APPLICATIONS FOR WEED DESTRUCTION . . . . .	188
7. SOME BOOKS OF REFERENCE . . . . .	191
8. CLASSIFICATION OF WEEDS UNDER THEIR NATURAL ORDERS . . . . .	193

## INDEXES.

I. SCIENTIFIC NAMES OF WEEDS . . . . .	198
II. LOCAL NAMES OF WEEDS . . . . .	201
III. POPULAR NAMES OF WEEDS . . . . .	205





# LIST OF ILLUSTRATIONS

## PHOTOGRAPHIC PLATES.

	FACING PAGE
FRONTISPIECE.	
Hoary Pepperwort in fruit. (Inset : Single fruit enlarged.)	
PLATE I. . . . .	44
1. Shepherd's Purse in fruit, normal condition.	
2. Ditto, attacked by White Rust Fungus. (Inset : Enlarged portion of stem.)	
3. Fool's Parsley; dwarfed plants frequent in stubbles.	
PLATE II. . . . .	55
1. Leaves of Charlock attacked by Turnip Flea Beetle. The two lower leaves show also the mines which are made by the larvæ of this insect. (Inset : The Beetle enlarged.)	
2. Roots of Charlock showing swellings caused by the larvæ of the Cabbage and Turnip Gall Weevil. (Inset : The Weevil enlarged.)	
PLATE III. . . . .	88
1. Enlarged fruits of (a) Hedge Mustard, (b) White Mustard, (c) Charlock, (d) Wild Radish.	
2. Fruiting spikes of Field Horsetail.	
PLATE IV. . . . .	108
1. Garlic Mustard with leaves attacked by the larvæ of the Diamond Back Moth.	
2. Creeping Thistle infested with Bean Aphis. (Inset : Bean Aphis enlarged.)	
3. Fruiting heads of Wild Carrot, with partial umbels and fruits detached.	
PLATE V. . . . .	124
1. Rayless Mayweed in Flower.	
2. Common Barberry in fruit.	
PLATE VI. . . . .	142
1. Nipplewort: dwarfed form frequent in stubbles.	
2. Ragwort.	
PLATE VII. . . . .	155
1. Common Daisy, showing creeping habit frequent on lawns.	
2. Creeping Buttercup, showing runners.	

## FIGURES IN TEXT

(Arranged alphabetically.)

	FIG.	PAGE
Bindweed, Black . . . . .	4	46
Bindweed, Common . . . . .	5	47
Crane's-bill, Dove's-foot . . . . .	15	122
Duckweed, Common . . . . .	26	168
Duckweed, Ivy-leaved . . . . .	27	168
Flax, Purging . . . . .	16	126
Floral Diagrams . . . . .	1	26
Grass, Annual Meadow . . . . .	6	71
Grass, Couch . . . . .	7	73
Grass, Meadow Soft . . . . .	17	131
Grass, Wall Barley . . . . .	18	133
Hawkbit, Autumnal . . . . .	19	134
Knotgrass . . . . .	8	82
Leaf Forms . . . . .	2	27
Lichen, Ground . . . . .	24	158
Milfoil, Water . . . . .	28	172
Mustard, White . . . . .	9	89
Nipplewort, Common . . . . .	10	91
Parsnip, Narrow-leaved Water . . . . .	29	173
Plantain, Greater . . . . .	25	160
Pondweed, American . . . . .	30	174
Pondweed, Broad-leaved . . . . .	31	175
Scabious, Small . . . . .	20	145
Sowthistle, Common . . . . .	11	103
Sowthistle, Corn . . . . .	12	104
Starwort, Water . . . . .	32	178
Stem Types . . . . .	3	28
Thistle, Creeping . . . . .	13	109
Thistle, Musk . . . . .	21	149
Toadflax, Sharp-pointed . . . . .	14	111
Tormentil . . . . .	22	150
Trefoil, Bird's-foot . . . . .	23	151



# PART ONE.

## CHAPTER I.

### HOW WEEDS ARE PROPAGATED AND DISPERSED.

*A. Methods of Propagation.*—In attempting to understand how weeds multiply in our fields and gardens, it is well to remember that the great majority of plants in this country may be arranged in three main groups according to the length of time taken to complete their full life-history. These groups are usually known by the terms *annual*, *biennial* and *perennial*.

1. *Annuals* have been defined as plants which live for one year only, but their life history is far more complex than would appear from this simple definition. There are many annuals, for instance, which are so rapid in growth that several generations may live and die in the course of a single growing season. The little Annual Meadow Grass and the abundant Groundsel are typical examples of weeds of this character. They may be found in flower and seed in any month of the twelve.

Then again, although it is usual for annuals to germinate in the spring, ripen their seeds in summer and autumn, and die at or before the approach of winter, there are many weeds which follow another course. Their seeds germinate as soon as they are scattered in the late summer months, but the young seedlings make no apparent effort to flower. They live as lowly and sturdy little growths throughout the whole of the winter, and then flower, seed, and die in the spring. In this habit they closely resemble the biennials, referred to below. Under certain conditions, too, plants which are recognised as annuals adopt the habits of perennials, and live for many years instead of one.

However interesting these facts may be to the biologist, the great practical fact about annual weeds is that their only method of propagation is by seeds. Hence if the production of flowers can be prevented, the plants will die out. They have no bulbs, corms, tubers or rhizomes

beneath the surface, but such roots as can live only so long as the aerial parts remain intact. This is in striking contrast to the perennial weeds referred to below. Annual weeds are mainly, though not wholly, confined to arable land.

2. *Biennials* are comparatively few in number and, as a class, are of little agricultural importance. Their chief characteristic is that their life-history is spread over two years instead of one. During the first year vegetative growth only is formed. In the second year flowers and seeds are produced, and the plant then dies. That, at any rate, is the usual course of their lives, but it is by no means without exception. Biennials may readily become either annuals, flowering, seeding and dying all in one season, or perennials, living for an indefinite period of time.

Keeping, however, the practical question of weed-control in mind, the great general rule about biennial weeds (such as some of the Thistles) is that they reproduce *only by seeds*. Hence, as with the annuals mentioned above, to prevent seed-production is to exterminate the plants.

3. *Perennials* are much more tenacious of life than weeds in either of the above classes, and differ fundamentally in that they *do not die after producing seeds*, but live through the winter in some form of hibernating structure (usually a modified underground stem), and then flower and seed again for an indefinite number of years.

Weeds of this class are usually the most troublesome of all to control. The great majority produce not only an abundance of fertile seed, but also a network of *subterranean* growths, any tiny part of which may be sufficient to produce new plants. This habit is well exemplified in such troublesome pests as the Couch Grass and the Field or Creeping Thistle.

The great practical point here is not only the prevention of seeding, but also the *eradication of the underground parts*. A single surface-hoeing of perennial weeds may do much more harm than good. It frequently happens

that for every single stem thus cut down, three or more new ones arise, each bearing an abundance of flowers as before. Also such hoeing may serve to cut up and distribute budding parts of the underground stems, and thus actually aid the dissemination of the weed.

It is worth emphasising, however, that the *repeated* hoeing or cutting of perennial weeds brings about a decided weakening of their vitality, and in some cases is quite sufficient eventually to exterminate them.

In the descriptions of weeds in this Book the usual duration of every plant is indicated by the letters A (=annual), B (=biennial) or P(=perennial), followed by the number of the months in which they flower, this factor being of such great practical importance in the control of the species.

*B. Agencies Concerned in the Dispersal of Weeds.*—Weed seeds may be dispersed in a number of ways, some of which are entirely beyond our control. In other cases, however, their dispersal can be considerably checked by appropriate methods, many of which are indicated in various parts of this Book. The principal means by which weed seeds are distributed in farm and garden are set out briefly below.

### 1. *Natural Methods of Dispersal.*

(a) By the wind. This applies not only to Thistles, Dandelions, and other plants using feathery attachments, but also to Poppies and other plants with minute seeds in open capsules.

(b) By explosive apparatus. The dry fruits of many weeds burst suddenly, in such a way as to shoot the seeds forcibly to a considerable distance. Gorse and the Wild Geraniums are good examples of this method.

(c) By birds. When feeding, these may scatter as many seeds as they eat. Also those which are swallowed may pass through the alimentary canal with their vitality unimpaired.

(d) By animals. Some seeds (*e.g.* nuts) eaten by animals may be carried away and dropped or hidden (*e.g.* by the squirrel). Other seeds or fruits may bear hooked bristles or similar attachments (*e.g.* Goosegrass, Burdock) and thus fix themselves to the coats of passing animals, being carried long distances from the parent plant.

(e) By water. Some plants (*e.g.* Water Lilies) bear fruits specially adapted to dissemination by water. In other cases flood-water may be responsible for the dispersal of many streamside plants.

2. *Artificial Methods of Dispersal.* (See also Chapter 2.)

(a) By the sowing of impure seed.

(b) By the use of manures containing weed seeds.

(c) By the improper disposal of the tailings from threshing machines, dressing machines, etc., and of refuse from hay-lofts and stack yards.

(d) By farm carts, implements and machinery. Seeds may be carried in the soil adhering to the wheels, or to the hoofs of the horses, and also in threshing machines and chaff-cutters, and in carts at hay-time and harvest.

*Note.*—It should be remembered that weeds often settle down in waste places before they colonise cultivated ground, and then creep gradually onwards by seed and root. The weeds of hedgerows and rough places generally, if allowed to remain to maturity, may be the means of contaminating large areas of valuable land, and the strictest vigil, combined with prompt measures of control, is often necessary to hold this common danger in check.



## CHAPTER 2.

### GENERAL METHODS OF WEED CONTROL.

The methods available for the suppression of weeds may be classified under ten headings, as follows :—

#### 1. *The Use of Clean Seed and Manure.*

This is the most important preventive measure, and if every care be taken not to introduce weed seeds in this way, much labour and expense will be saved later on. It is specially important to avoid the introduction of injurious weeds when sowing grasses and clovers, as these are most liable to contain impurities. No seed should be purchased without having a high degree of purity guaranteed, and although such seed may cost more at the outset, it is most economical in the long run. The importance of using only thoroughly cleaned seed cannot be emphasised too strongly.

Manure likely to contain live weed seeds should not be applied to arable land, but may generally be used on permanent grass land without harmful results. Fresh stable manure is a frequent source of weed seeds, and its use in gardens or on arable land is not to be recommended. Only well-rotted farmyard manure should be employed.

#### 2. *Tillage Operations.*

Surface cultivation in the spring is one of the most useful methods. After ploughing, the soil is worked to a fine tilth, by means of cultivators and harrows. This encourages the seeds present in the soil to germinate, when the seedlings are destroyed by further cultivating and harrowing. Shallow ploughing or cultivating of stubble as soon as the crop is cleared, followed by deeper ploughing during the winter, destroys great numbers of weeds.

In some cases deep ploughing will destroy weeds; but the seeds of others, such as Charlock, retain their vitality for many years, and germinate when they are again brought to the surface.

Horse-hoeing is a very useful method of keeping the spaces between the rows of young root crops, beans, or spring corn free from weeds, but requires to be supplemented by hand hoeing.

3. *Fallowing.* Bare fallowing is rarely done now under modern farming conditions, but may be sometimes necessary when land has got into a very bad state. By this method the seed is "grown out" of the land. Several successive crops of weeds may be destroyed during the summer and autumn by shallow ploughing, disc-harrowing, scuffling, etc. On the other hand, fallow crops, or "cleaning crops," are an essential part of the farm rotation. Many weeds are destroyed in the preliminary preparation of the land, and the crops are horse-hoed and hand-hoed until the plants are too large to permit it. Plants which cover the ground well with foliage in the later stages of growth, such as potatoes, are most useful as cleaning crops. On very weedy land it is the custom to take two root crops in succession, preparing the land well and hoeing the crops as thoroughly and for as long as possible.

#### 4. *Hand Pulling, Digging and Cutting.*

The removal of weeds by hand is in many cases the only practicable method.

In agriculture it is chiefly done in corn and other crops which have grown too high for hoeing or other treatment, but under good farming it should rarely be necessary to resort to hand pulling. When it is, the work may usually be done by casual labour, women and children being generally employed.

Where Docks are troublesome, women are often employed to remove them, either by hand pulling or with "docking irons."

Digging out the roots is sometimes necessary in other cases, as where poisonous weeds occur in grass land.

The creeping stems of Couch Grass are forked out and

collected by hand. In all cases the removed weeds, and those gathered up by the harrow, should be burnt.

On grass land spudding takes the place of hoeing for the removal of young Thistles, etc., while on pastures and waste land, weeds should be frequently cut down with a hook, scythe, or mowing machine.

In gardens removing weeds from lawns with a knife or a "daisy grubber" is often the best method, and hand weeding of flower beds is frequently a necessity.

The margins of ditches, ponds and watercourses should be periodically trimmed up with a scythe or hook, and cutting is the only method of dealing with water weeds on a large scale (see Section IV.).

The mowing of meadows in itself tends to check the rank growth of weeds, but when it is specially desirable to improve the herbage, mowing should be done early, before seeding takes place.

### 5. *Liming and Manuring.*

On some land continual applications of dung, and such manures as superphosphate, sulphate of ammonia, etc., tend to produce an acid, or "sour" condition of the soil. Many weeds flourish far better on such land than they do on soil of an alkaline nature, while the cultivated crops are of an inferior quality and are unable to derive full benefit from nitrogenous and phosphatic manures. Lime is therefore applied to remedy this condition by neutralising the acidity and rendering available the plant foods present in the soil. The reduction of weeds is an indirect result of this treatment.

Some weeds, such as Spurrey, Sheep's Sorrel, Corn Marigold, etc., are very intolerant of lime and are soon eradicated by its use.

Manuring, as a measure against weeds, is chiefly applicable to grass land.

Nitrogenous manures alone encourage both weeds and grass equally, and promote vigorous and rank growth.

Phosphatic manures and potash, with a little nitrogen, tend to encourage the grasses and clovers at the expense of the weeds, which are gradually choked out to a great extent.

#### *6. The Growing of Smother Crops.*

This is a very effective method of choking out weeds, particularly if the green crop is followed by roots. These crops are either fed off on the land by sheep, cut as green feed for cattle, made into silage, or ploughed in as "green manure." The principal plants used are Lucerne, White Mustard, Rape, Rye, Sanfoin, Vetches; and, in the southern counties, Maize.

#### *7. Feeding off with Livestock.*

Some pasture weeds, as Ragwort, Rest Harrow, Knapweed, and Yellow Rattle, may be reduced and kept in check by close grazing with sheep during the early part of the season. Crops of young cereals, so badly infested with weeds as to be worthless, are sometimes fed off with sheep.

#### *8. Draining.*

Many weeds prevalent on wet land can only be permanently reduced by draining. The chief plants to which this applies are Floating Foxtail, Horsetails, Mosses, Rushes and Sedges.

#### *9. Change of Crop.*

The ordinary rotation of crops in itself tends to check weeds and offers opportunities for their destruction, but in special cases something more than this may be necessary. This is especially the case with the parasitic weeds, Dodder and Broomrape, which attack Clover, etc. No leguminous crop should be grown on infested land for a number of years.

Sowing down arable land to grass will eradicate some

weeds; while on the other hand, it may be necessary to break up and cultivate grass land to exterminate others effectually.

10. *Chemical Applications.*

The Sulphates of Ammonia, Copper and Iron are largely used in solutions for spraying cereals infested with Charlock and other weeds. The grain crops are but slightly injured, while many weeds are destroyed or prevented from seeding. Other sprays, as Carbolic and Sulphuric Acid, are used for special purposes; and poisonous Weed Killers are applied to paths, etc.

Kainit, Iron Sulphate, Salt, etc., are also used in the dry state for killing weeds.

(For detailed information see Appendix 6.)

*Note.*—The control measures specially applicable to the various kinds of weeds depend mainly on their manner of growth and the duration of their life, which information is given under each species. (For general remarks on this subject see Chapter 1.)

Thus, while prevention of seeding is the chief way of combating annuals, which plants may be safely buried with the plough or spade before reaching the fruiting stage, such a method is quite useless with perennials, and serves only to propagate those with a creeping rootstock.



## CHAPTER 3.

### ALIEN WEEDS.

Even a superficial study of the alien weeds of this country indicates the immense importance of identifying any new-comer into our fields and gardens, and of finding some effectual method of controlling its dispersal.

Of recent years the Hoary Pepperwort, or Thanet Weed (*Lepidium Draba*), has caused considerable consternation in agricultural circles. It is said to have been introduced into Thanet about 100 years ago, and has since that time been successful in establishing itself to a serious degree in several of our eastern counties. Its creeping rootstocks have been known to reach a depth of fully four feet, and as these are capable of giving rise to new plants in quite a short space of time, the difficulty of eradicating such a pest will be at once perceived.

Perhaps the most important lesson which the Hoary Pepperwort holds for the agriculturist is that a very serious danger lies in the coming to our shores of any alien weed. This is a fact which can scarcely be too strongly emphasised, and one that has received but scant attention in this country. The truth is that when any new species colonises fresh territory, it frequently carries all before it. In its new environment it appears to gain some advantage over the indigenous species, and spreads and multiplies to an almost appalling degree.

It is strange that the opinion should be so widely held that the Hoary Pepperwort is practically the only alien weed that need disturb the agriculturist in this country. That opinion has arisen, of course, merely because this particular weed is a comparatively recent immigrant from abroad, and is almost the only one which has, during living memory, become a serious pest over wide areas.

Alien weeds in Britain, however, are legion. The fact that they have been here for many generations, and are now erroneously called "natives," does not in any way affect the main point at issue, which is that our country was once free from them, and would probably have been

free to-day if the right measures had been known, and adopted in good time.

Another alien weed of modern times is the Rayless May-weed (*Matricaria discoidea*). Up to the present it does not appear to have aroused much attention in the agricultural world, but there is little doubt that it is increasing its hold very rapidly. It is already a familiar weed in the eastern, southern, and northern counties of England, and is, like so many other undesirable tenants of the soil, remarkably tenacious of life. Its ability to adapt itself to varied environments gives it a dangerous power, and it does not appear to have been slow to take advantage of it. It may be seen flowering profusely, though only a few inches high, on the dusty, trodden trackway, and again, in the lush growth of rich land, a large, branching, bushy plant, scarcely recognisable as the same species.

It is not possible here to go into botanical science, but the evidence that the great majority, at any rate, of those weeds found only on cultivated ground came to this country as aliens is overwhelming. They are given as indigenous plants in our botany books and floras, but they are not natives—they are merely naturalised. They found a congenial environment, and so stayed and prospered.

In this large group of ancient aliens, many of our most troublesome weeds of to-day may be classed, and no stronger argument for constant vigil, and for scrupulous attention to the purity of farm seeds, could surely be found. Even the dreaded Charlock itself, and its near relatives the Wild Radish and the Pennycress, are not indigenous to Britain. They do not—indeed cannot—thrive where the land is left in its primitive state.

Other truly alien pests of the cornfield are the Poppies, the Corn Cockle, Cornflower, Fumitory, Fool's Parsley, Corn Marigold, Corn Woundwort, and Sow Thistle. The natural home of these weeds is some country other than Britain, and they rob us to-day merely because their skill as colonisers is more potent than our efforts have been to drive them out.

There are other common weeds, too, which fall in this same large class of aliens. Amongst the more important, from an agricultural point of view, may be mentioned Shepherd's Needle, several species of Goosefoots, at least two of the commonest Speedwells, White Campion, Shepherd's Purse, several Spurges, Red and White Dead-nettles, Mallow, Black Nightshade, and a number of others.

A mere glance over these lists—and they are by no means exhaustive—should serve to stress the importance of an early and determined attack upon any alien weed that should venture into this country as its predecessors have done. Until some considerable knowledge of weeds is gained, however, sufficient at least to enable them to be identified and named, the recognition of new-comers can hardly be possible. In this particular direction the detailed description of all our commonest weeds, as given in the body of this work, should prove of considerable help. The identification of weeds is a matter of very real practical importance, and a brief discussion concerning it forms the subject of the following Chapter.

## CHAPTER 4.

### THE IDENTIFICATION OF WEEDS.

Although there are many control measures which can be used against weeds in a general sort of way, it often becomes necessary, if we would fight these enemies of our crops economically and expeditiously, to know something of their individual habits of life, their principal methods of multiplication, and the most vulnerable stages of their life-history.

And one of the first steps to take, in endeavouring to control the spread of weeds which infest our land, is to discover the names of the pests we desire to exterminate. The mere name in itself, of course, is of no practical value, but as soon as it is known to us we are in a position to acquaint ourselves with what has been said or written concerning the weed in question. We can profit, that is, by the experience of others, instead of plodding laboriously over the very same ground which they have covered before us.

The great majority of information in this book relates to special weeds, and to the most approved methods of controlling or exterminating them, and is therefore accessible only to those who know these weeds by their names. It is the aim, therefore, of the present Chapter, to provide as simple a means as possible for the identification of all the weeds dealt with in this Book.

It must be urged here, however, that the naming of plants can never be made a simple and positive matter. They are too numerous, too varied, and too variable in their forms and habits to permit of accurate naming without a vast amount of specialised knowledge. The "Key" which follows is not intended to be either scientific or perfect. From a botanical point of view it is valueless and misleading. Its sole aim is to enable those who have no time to study botany to arrive at the names of the weeds infesting their land. For this reason practically all scientific terms have been excluded, and only those characters mentioned which can be readily determined by anyone on a moderately careful examination.

When an unknown weed has been found, the GROUP KEY should be referred to first of all, and a beginning made at the phrases marked by the figure 1. Each phrase in the Key is to be regarded as a question. If the answer is in the negative, then reference is made to the phrase with the same number immediately beneath. If the answer is in the positive, then the number to the right of the phrase tells one where to seek for further information. If this number is just a plain figure, the reference will be found lower down in the same Key. If a Group is referred to, then that particular Group should be sought in the pages which follow.

The Group itself having now been found, the course of procedure is the same as before. Great care should be taken to determine each character as accurately as possible before proceeding to the next, and when finally the name of a plant is reached, its detailed description should be referred to in the body of the Book.

It must not be supposed that, by the aid of this Key, the name of any plant found growing in the countryside can be determined. Only those plants have been included which are definitely "weeds," and which are likely to be troublesome in some part of farm, garden or green, but every plant which has been described in the body of the Book is given its appropriate place in the Key, so that it is possible to track it down wherever it occurs.

Owing to the great variability of almost all our weeds, it is quite possible that the first attempt to name any particular one may fail. When such is the case, it is recommended that a second, or even a third, attempt be made. Some flowers, for instance, are on the very border-line of colour, and if their names cannot be found in one Group, such as that of the blues and purples, they should be sought in another possible Group, such as that of the reds and pinks.

Then again, one must never be too hasty in classifying a plant as flowerless, just because no blossoms can be found. Most of our weeds bear flowers at some stage of their life-



history, though these are often so small and inconspicuous that they escape the attention even when at their best. The number of truly flowerless species, on the other hand, is very small. The only flowerless weeds described in this book are Algae (which occur in water only), Fungi, Mosses, Ferns, and Horsetails.

It seems almost unnecessary to stress here the great advantage of studying plants in their truly Natural Orders, which is, perhaps, the best of all ways of identifying them and of understanding them. It would, of course, be out of place in a book of this character to deal with a subject so intricate and extensive, but an outline classification of all the weeds described will be found in Appendix 8, where each plant is given a place under its own Natural Order.

Readers who wish to pursue further the study of British wild flowers will find in the "Manual of British Botany" (see Appendix 7) an invaluable aid to their work. This excellent little book is unique in that, whilst containing detailed descriptions of all our British flowering plants and ferns, it is yet small enough to be carried in the pocket with ease, and so becomes an indispensable companion to the botanist in the fields.

For the detailed study of the grasses, however, a special volume is essential, and S. F. Armstrong's "British Grasses, and their Employment in Agriculture" (see Appendix 7) will make a special appeal to those who are interested in farming practice. It contains descriptions of all our native species, and illustrations of most of them, as well as excellent "keys" to identification, and much useful information regarding their agricultural values.

Both of these books have been freely referred to in the compilation of the following tables, etc., and acknowledgment is gratefully given.



## GLOSSARY OF BOTANIC TERMS.

*Note.*—As this Book has been written mainly for non-botanical readers, scientific terms have been almost wholly excluded. The following short list includes all those which are likely to cause any difficulty.

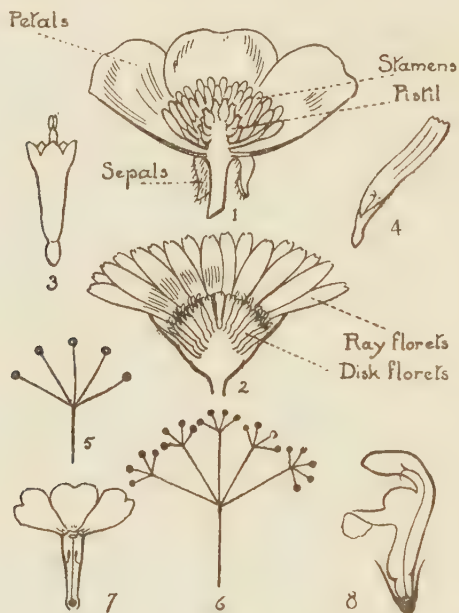


Fig. 1.

## FLORAL DIAGRAMS.

(For details, see *Glossary*.)

- (1) Simple flower of Buttercup, in section.
- (2) Compound flower of Daisy, in section.
- (3) A typical disk-floret.
- (4) A typical ray-floret.
- (5) A simple umbel.
- (6) A compound umbel.
- (7) A typical one-piece corolla, in section.
- (8) A typical two-lipped corolla, in section.

*Annual*—See Chapter 1.

*Biennial*—See Chapter 1.

*Corolla*—The name usually given to the coloured part of

a flower, *i.e.*, the part lying between the sepals and the stamens. If it is composed of separate parts, each is spoken of as a petal. (Fig. 1.)

*Egg-shaped*—Used here principally in the description of



Fig. 2.

# LEAF FORMS.

(For details, see *Glossary*.)

- (1) Lance-shaped leaf.
- (2) Oblong leaf.
- (3) Egg-shaped leaf.
- (4) Inversely egg-shaped leaf.
- (5) Heart-shaped leaf.
- (6) Inversely heart-shaped leaf.
- (7) Lyre-shaped leaf.
- (8) Pinnate leaf.
- (9) Whorled leaves.

leaves. It indicates that they are longer than broad, and that the lower part is broader than the end. A leaf is called *inversely* egg-shaped when it is broader at the end than at the base. (Fig. 2.)

*Fruit*—Used throughout the book to indicate the seed-

bearing part of the plant which follows the flower, whether it be berrylike and juicy, or hard and dry.

*Heart-shaped*—Used here principally in the description of leaves. It indicates that they are more or less rounded in

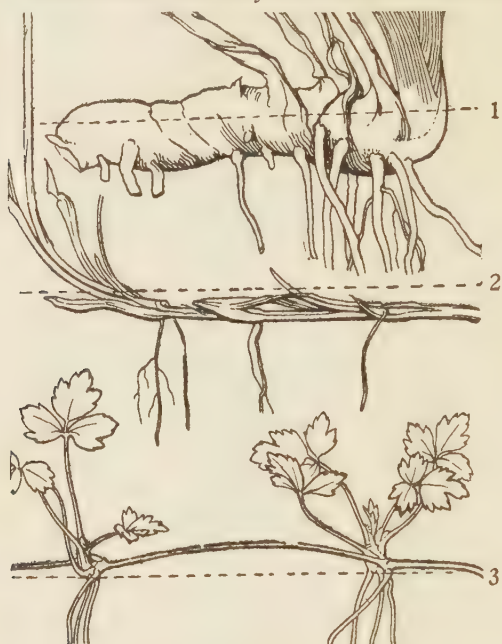


Fig. 3.

#### TYPES OF STEMS.

(For details, see *Glossary*.)

(The dotted line indicates the approximate level of the soil.)

- (1) Typical thickened rootstock, or rhizome, of Iris.
- (2) Slender creeping rootstock of Couch Grass.
- (3) Runner of Creeping Buttercup.

(About  $\frac{2}{3}$  nat. size.)

shape, with the bases lobed like a heart. A leaf is called *inversely* heart-shaped when it has the broader, lobed end opposite to the stalk. (Fig. 2.)

*Inversely*—Used in conjunction with the terms egg-shaped and heart-shaped, which see.

*Lance-shaped*—Applied to a leaf which is long and narrow, tapering towards each end. (Fig. 2.)

*Lyre-shaped*—A term used mainly for the leaves of dandelion-like plants, *i.e.*, for those which are deeply lobed or cut along the sides, and have a large rounded segment at the end. (Fig. 2.)

*Oblong*—An oblong leaf or fruit is one which is of a long oval shape, with its length about three or four times greater than its breadth, and equally broad and rounded at each end. (Fig. 2.)

*Perennial*—See Chapter 1.

*Petal*—A name given to one single coloured “ leaf ” of the several which form the corolla of the flower. (Fig. 1.)

*Pinnate*—A pinnate leaf usually has several leaflets arranged on opposite sides of the leaf-stalk, but the term is also sometimes used to indicate that several leaflets arise from a common stalk, whether in opposite pairs or not. (Fig. 2.)

*Pistil*—Usually the central organ of the flower, standing at the summit of the seed-box, and surrounded by the stamens. It often consists of several parts. (Fig. 1.)

*Rootstock*—An underground stem, often thickened. (Fig. 3.)

*Sepal*—A name given to one single “ leaf ” of the outer whorl of the parts of a flower. The sepals usually lie immediately beneath the petals, and are mostly green, and leaf-like in character. (Fig. 1.)

*Stamens*—The organs of a flower which contain the fertilising dust called pollen. They are usually pin-like in shape, *i.e.*, with a stalk and a head. (Fig. 1.)

*Standard*—A name often applied to the upper petal of a pea-shaped flower. The side petals are known as “ wings,” and the two lower ones as the “ keel.”

*Umbel*—A term used for a cluster of flowers whose stalks are of approximately equal length, all arising from a common centre. An umbel may be simple or compound. (Fig. 1.)

*Whorl*—Applied both to leaves and flowers which grow in ring-form round the stem. (Fig. 2.)

# KEY TO THE IDENTIFICATION OF BRITISH WEEDS.

N.B.—*The whole of the Weeds described in this Book have been arranged in twelve artificial Groups. The GROUP KEY below will enable the appropriate Group to be found, and the unknown plant may then be tracked down in the manner indicated. The first part of this Chapter should be read carefully before any attempt is made to use this Key.*

## GROUP KEY.

- |                                                        |                  |
|--------------------------------------------------------|------------------|
| 1 Plant growing on land.                               | 2                |
| 1 Plant growing in water, or by water-side.            | 4                |
| 2 Flowering plant.                                     | 3                |
| 2 Flowerless plant.                                    | GROUP 6 (p. 39)  |
| 3 Flowers mainly some shade of lilac, blue, or purple. | GROUP 1 (p. 31)  |
| 3 Flowers mainly some shade of pink or red.            | GROUP 2 (p. 32)  |
| 3 Flowers mainly or entirely white or cream.           | GROUP 3 (p. 34)  |
| 3 Flowers mainly some shade of yellow.                 | GROUP 4 (p. 36)  |
| 3 Flowers mainly greenish or brownish, small.          | GROUP 5 (p. 38)  |
| 4 Flowering plant.                                     | 5                |
| 4 Flowerless plant.                                    | GROUP 12 (p. 42) |
| 5 Flowers mainly some shade of lilac, blue, or purple. | GROUP 7 (p. 40)  |
| 5 Flowers mainly some shade of pink or red.            | GROUP 8 (p. 40)  |
| 5 Flowers mainly or entirely white or cream.           | GROUP 9 (p. 40)  |
| 5 Flowers mainly some shade of yellow.                 | GROUP 10 (p. 41) |
| 5 Flowers mainly greenish or brownish, small.          | GROUP 11 (p. 41) |

GROUP I.

*Plants bearing flowers whose predominating colour is some shade of lilac, blue, or purple.*

- |    |                                                                                                                                                                 |    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1  | Flowers compound, that is, with many minute flowers, called <u>florets</u> , all grouped into one main flower-head, as in the common Thistles, Cornflower, etc. | 2  |
| 1  | Flowers simple, that is, growing singly, and not grouped into a general flower-head.                                                                            | 8  |
| 2  | Leaves prickly.                                                                                                                                                 | 3  |
| 2  | Leaves not prickly.                                                                                                                                             | 4  |
| 3  | Probably a Thistle of some kind, or perhaps Teazle.                                                                                                             |    |
| 4  | Flowers blue.                                                                                                                                                   | 5  |
| 4  | Flowers purple.                                                                                                                                                 | 6  |
| 4  | Flowers mauve.                                                                                                                                                  | 7  |
| 5  | Probably Cornflower, Chicory or Sheep's Scabious.                                                                                                               |    |
| 6  | Probably a Knapweed, or the Devil's-bit Scabious.                                                                                                               |    |
| 7  | Probably a Scabious, or perhaps Teazle.                                                                                                                         |    |
| 8  | Each petal in flower growing separately.                                                                                                                        | 9  |
| 8  | Corolla of flower all in one piece.                                                                                                                             | 14 |
| 9  | Petals 3. Probably Milkwort.                                                                                                                                    |    |
| 9  | Petals 4.                                                                                                                                                       | 10 |
| 9  | Petals 5.                                                                                                                                                       | 13 |
| 10 | Flowers white or lilac. Probably Lady's Smock.                                                                                                                  |    |
| 10 | Flowers reddish, leaves finely cut.                                                                                                                             | 11 |
| 10 | Flowers purplish, leaves simple.                                                                                                                                | 12 |
| 11 | Probably Fumitory.                                                                                                                                              |    |
| 12 | Probably one of the Willowherbs.                                                                                                                                |    |
| 13 | Probably a Crane's-bill, Corn Cockle or Field Pansy.                                                                                                            |    |
| 14 | Corolla quite regular, <i>i.e.</i> , equally divided all round.                                                                                                 | 15 |
| 14 | Corolla irregular, <i>i.e.</i> , with lobes varying in size or shape.                                                                                           | 22 |
| 15 | Corolla with 4 lobes.                                                                                                                                           | 16 |



15	Corolla with 5 lobes.	17
15	Corolla with 6 lobes.	21
	16 Probably Heather or Field Madder.	
17	Flowers blue.	18
17	Flowers purplish.	19
17	Flowers whitish or lilac.	20
	18 Probably Field Bugloss or a Forget-me-not, or perhaps Comfrey.	
19	Probably Comfrey, Field Gentian, or Corn Campanula.	
	20 Probably Corn Salad or Comfrey.	
21	Probably Meadow Saffron.	
	22 Flowers roughly two-lipped in form, as in Deadnettles.	23
	22 Flowers not distinctly lipped.	26
23	Corolla deep blue or purple.	24
23	Corolla pale reddish, often variegated with yellow, etc.	25
	24 Probably Bugle, Early Purple Orchis, or Self-Heal.	
25	Probably Eyebright, Corn Woundwort, Cow-wheat, or Hempnettle.	
	26 Probably a Speedwell, or perhaps Corn Mint, Viper's Bugloss, or Teazle.	

## GROUP 2.

*Plants bearing flowers whose predominating colour is some shade of pink or red, including everything from pale rose to bright scarlet, with variegations.*

1	Flowers compound, that is, with many minute flowers, called florets, all grouped into one main head, as in Thistles, Groundsel, etc.	2
1	Flowers simple, that is, growing singly, and not grouped into a general flower-head.	5
	2 Leaves large and stout, often 1 ft. across, roundish, undivided.	3
	2 Leaves medium or small, or cut into segments.	4

- 3 Probably Burdock or Butterbur.
  - 4 Probably a Knapweed, or Yarrow, or perhaps Thrift.
- 5 Each petal in flower growing separately. 6
- 5 Corolla of flower all in one piece. 13
  - 6 Petals 3. Probably Milkwort.
  - 6 Petals 4. 7
  - 6 Petals 5. 8
  - 6 Petals 6. 12
- 7 Probably a Willowherb or a Poppy, or perhaps Fumitory.
  - 8 Stem woody, prickly, straggling. 9
  - 8 Plant stout, small flowers crowded into large, dense umbels, whitish. 10
  - 8 Plant about 2 ft. or less, flowers not crowded, pink to red. 11
- 9 Probably a Blackberry, or perhaps Spiny Restharrow.
  - 10 Probably Hogweed.
- 11 Probably a Crane's-bill or Stork's-bill, or Red Campion or Herb Robert, or perhaps Ragged Robin. Possibly Knotgrass, or Persicaria, or Restharrow.
  - 12 Probably a Garlic.
- 13 Corolla quite regular, *i.e.*, equally divided all round. 14
- 13 Corolla irregular, *i.e.*, with lobes varying in size or shape. 21
  - 14 Corolla with 4 lobes. 15
  - 14 Corolla with 5 lobes (or none). 16
- 15 Probably a Heath or Heather, or possibly a Dodder.
  - 16 Stem twining. 17
  - 16 Stem not twining. 18
- 17 Probably a Bindweed or a Dodder.
  - 18 Plant large and stout. 19
  - 18 Plant small. 20
- 19 Probably Comfrey.

- 20 Probably Centaury or Pimpernel, or perhaps Bindweed.
- 21 Probably a Deadnettle, Bartsia, or Lousewort, or perhaps Spotted Orchis.

## GROUP 3.

*Plants bearing flowers which are mainly or entirely white, cream, or very slightly tinted.*

- 1 Flowers compound, that is, with many minute flowers, called florets, all grouped into one main head, as in Daisies and Dandelions.
- 1 Flowers simple, that is, growing singly, and not grouped into a general flower-head. 6
- 2 Leaves cut into many fine segments. 3
- 2 Leaves uncut, or only notched or lobed. 4
- 2 Leaves shamrock-like. 5
- 3 Probably a Mayweed, or Chamomile, or perhaps Yarrow.
- 4 Probably a Daisy, or Ox-eye Daisy, or perhaps Thrift.
- 5 Probably Dutch Clover.
- 6 Each petal in flower growing separately. 7
- 6 Corolla of flower all in one piece. 32
- 7 Petals 3. Probably Milkwort.
- 7 Petals 4. 8
- 7 Petals 5. 18
- 7 Petals 6. 31
- 8 Flowers  $\frac{1}{4}$  in. diameter, or more. 9
- 8 Flowers less than  $\frac{1}{4}$  in. diameter. 14
- 9 Plant woody, climbing. 10
- 9 Plant herbaceous, not climbing. 11
- 10 Probably Wild Clematis.
- 11 Fruit a long and narrow pod. 12
- 11 Fruit roundish or heart-shaped. 13
- 12 Probably Lady's Smock, Garlic Mustard, or Wild Radish.
- 13 Probably Candytuft, Pennycress or Hoary Pepperwort.

# *The Identification of Weeds* 35

14	Fruit a long and narrow pod.	15
14	Fruit heart-shaped.	16
14	Fruit roundish or oval.	17
15	Probably a Bittercress or Thalecress.	
16	Probably Shepherd's Purse.	
17	Probably Swine's Cress, or Field Pepperwort, or perhaps Pearlwort.	
18	Flowers in distinct umbels.	19
18	Flowers not in umbels.	22
19	Leaves divided.	20
19	Leaves not divided.	21
20	Probably one of the Parsleys, or Wild Carrot, Goutweed, Hogweed, or Pignut.	
21	Probably Marsh Pennywort.	
22	Flowers more than $\frac{1}{4}$ in. in diameter.	23
22	Flowers $\frac{1}{4}$ in. diameter, or less.	24
23	Probably White or Bladder Campion, or perhaps Blackberry, or Dutch Clover.	
24	Flowers pea-shaped.	25
24	Flowers not pea-shaped.	26
25	Probably Dutch Clover.	
26	Plant $1\frac{1}{2}$ ft. high, or more.	27
26	Plant less than $1\frac{1}{2}$ ft.	28
27	Probably Meadowsweet.	
28	Leaves in rings round stem.	29
28	Leaves not in rings round stem.	30
29	Probably Corn Spurrey.	
30	Probably a Chickweed, Sandwort, Pearlwort, or Purging Flax, or perhaps Knotgrass, Persicaria, or Black Bindweed.	
31	Probably a Garlic.	
32	Corolla quite regular, <i>i.e.</i> , equally divided all round.	33
32	Corolla irregular, <i>i.e.</i> , with lobes varying in sizes or shape.	42
33	Flowers 1 in. diameter, or more.	34
33	Flowers less than 1 in. diameter.	35

- |    |    |                                         |    |
|----|----|-----------------------------------------|----|
|    | 34 | Probably a Bindweed.                    |    |
| 35 |    | Plant bearing black berries.            | 36 |
| 35 |    | Plant without black berries.            | 37 |
|    | 36 | Probably Black Nightshade.              |    |
| 37 |    | Plant bearing leaves.                   | 38 |
| 37 |    | Plant leafless.                         | 41 |
|    | 38 | Leaves in rings round stem.             | 39 |
|    | 38 | Leaves not in rings round stem.         | 40 |
| 39 |    | Probably a Bedstraw, or Goosegrass.     |    |
|    | 40 | Probably Comfrey, or Gromwell.          |    |
| 41 |    | Probably a Dodder.                      |    |
|    | 42 | Probably White Deadnettle or Eyebright. |    |

## GROUP 4.

*Plants bearing flowers whose predominating colour is some shade of yellow.*

- |   |                                                                                                                                      |                                                            |
|---|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 1 | Flowers compound, that is, with many minute flowers, called florets, all grouped into one main head, as in Dandelions and Marigolds. | 2                                                          |
| 1 | Flowers simple, that is, growing singly, and not grouped into a general flower-head.                                                 | 10                                                         |
| 2 | Florets all strap-shaped, as in Dandelion.                                                                                           | 3                                                          |
| 2 | Florets all tubular (central disk only) as in Groundsel.                                                                             | 8                                                          |
| 2 | Outer florets strap-shaped, inner tubular, as in Daisy or Marigold.                                                                  | 9                                                          |
| 3 | Leaves prickly.                                                                                                                      | 4                                                          |
| 3 | Leaves not prickly.                                                                                                                  | 5                                                          |
|   | 4                                                                                                                                    | Probably a Sowthistle.                                     |
| 5 | Flower-heads less than $\frac{1}{2}$ in. diameter.                                                                                   | 6                                                          |
| 5 | Flower-heads more than $\frac{1}{2}$ in. diameter.                                                                                   | 7                                                          |
|   | 6                                                                                                                                    | Probably Nipplewort.                                       |
| 7 | Probably a Dandelion, or Dandelion-like plant, such as Cat's-ear, Goat's-beard, Hawk's-beard, Hawkbit or Hawkweed.                   |                                                            |
|   | 8                                                                                                                                    | If not Groundsel, then probably Tansy, or Rayless Mayweed. |



# *The Identification of Weeds* 37

9	Probably Coltsfoot, Ragwort, or Corn Marigold.	
10	Each petal in flower growing separately.	11
10	Corolla of flower all in one piece.	24
11	Petals 4.	12
11	Petals 5.	15
11	Petals 6.	22
11	Petals 8—12.	23
12	Plant growing mainly in grass, less than 1 ft. high.	13
12	Plant growing in arable land, usually 1 ft. or more in height.	14
13	Probably Tormentil.	
14	Probably a Wild Mustard, or Charlock, or perhaps Wild Radish or Gold of Pleasure.	
15	Flowers pea-shaped.	16
15	Flowers not pea-shaped.	19
16	Plant shrubby.	17
16	Plant herbaceous.	18
17	Probably Gorse, Broom, or Dyer's Green-Weed.	
18	Probably a Trefoil or Medick.	
19	Flowers smaller than Buttercups.	20
19	Flowers as large as Buttercups.	21
20	Probably Agrimony, Herb Bennet, or Spearwort.	
21	If not a Buttercup, then probably a Cinquefoil or Silverweed.	
22	Probably Barberry or Mignonette.	
23	Probably Lesser Celandine.	
24	Corolla quite regular, <i>i.e.</i> , equally divided all round.	25
24	Corolla irregular, <i>i.e.</i> , with lobes varying in size or shape.	26
25	If not a Cowslip, then probably yellow Bedstraw or Yellow-and-blue Forget-me-not.	
26	Flower more or less two-lipped.	27
26	Flower not two-lipped.	34
27	Flower with a definite spur.	28

27	Flower without a spur.	29
	28 Probably a Toadflax.	
29	Plant leafless.	30
29	Plant with leaves.	31
	30 Probably a Broomrape.	
31	Corolla entirely yellow.	32
31	Corolla variegated.	33
	32 Probably Yellow Bartsia, Common Cow- wheat, or Yellow Rattle.	
33	Probably a Hemp Nettle.	
	34 Probably a Field Pansy.	

## GROUP 5.

*Plants bearing flowers which are mostly greenish or brownish in colour, and very small in size, generally without any petals whatever, and usually more or less inconspicuous.*

The plants in this Group do not lend themselves to arrangement in a simple "key," but the following rough classification may be of some assistance in indicating their position in the body of the book, where detailed descriptions will be found.

(1) *Grasses, Sedges and Rushes.* The stems of Grasses are usually round and hollow, those of Sedges are solid, and often triangular. Rush leaves are mainly cylindrical, but flat in a few species, and the flowers are mostly brown.

(2) *Docks, Sorrels, Goosefoots and Oraches* are all closely related plants, and have similar forms and habits of growth. They vary in height from a few inches to several feet. The tiny flowers are mainly greenish or red-tinted, and grow in dense clusters.

(3) *Knotgrass, Persicaria and Black Bindweed* are near relatives of the Docks, but are smaller and much more slender plants, and their habit of growth is so different that the relationship is obvious only in the structure of their

minute flowers, which are sometimes even brightly tinted with pink or red.

(4) *The True Nettles* have greenish flowers, and are well known by their powers of stinging. There are two common species.

(5) *The Spurges* are mostly rather small plants, with greenish-yellow flowers and an abundance of milky sap, which exudes immediately the stems are broken. There are three or four common species.

(6) *The Plantains* have all their leaves in a rosette at the very base of the plant, and the flowers are in dense spikes at the summits of usually long stalks. The colour of the spikes varies from green (in the Greater Plantain) to dark brown or black (in the Ribwort Plantain), and even to bright mauve (in the Hoary Plantain).

(7) *The Cudweeds* are small plants with inconspicuous, clustered, brownish flowers in roundish heads, and the leaves and stems are usually densely covered with a silvery grey down, affecting the appearance of the whole plant.

(8) *The Garlics* may be known at once by their powerful onion-like scent when bruised.

(9) *Unclassified Weeds* with green or brownish flowers include the following species :—Salad Burnet, Hop, Lady's Mantle, Rue, Carline Thistle, Broomrapes, Knawel, Mercury, Mugwort, Mousetail. References to descriptions of all these may be found in the Index.

#### GROUP 6.

*Plants which never bear flowers at any stage of their life-history.*

- |   |                                                                                  |   |
|---|----------------------------------------------------------------------------------|---|
| 1 | Plants with green stems, or leaves, or leaf-like growths, or both, as in Mosses. | 2 |
| 1 | Plants leafless, with little or no green colour, as in Toadstools.               | 3 |
|   | 2 Probably a Moss, a Fern, or a Horsetail.                                       |   |
| 3 | Probably a Fungus or a Lichen.                                                   |   |

## GROUP 7.

*Plants bearing flowers whose predominating colour is some shade of lilac, blue or purple.*

- |   |                                                          |   |
|---|----------------------------------------------------------|---|
| 1 | Each petal in flower growing separately.                 | 2 |
| 1 | Corolla of flower all in one piece.                      | 3 |
|   | 2 Probably Purple Loosestrife or Great Hairy Willowherb. |   |
| 3 | Plant with strong scent.                                 | 4 |
| 3 | Plant scentless.                                         | 5 |
|   | 4 Probably one of the Water Mints.                       |   |
| 5 | Flower clusters in opposite pairs.                       | 6 |
| 5 | Flower clusters not in opposite pairs.                   | 7 |
|   | 6 Probably Brooklime or Water Speedwell.                 |   |
| 7 | Probably Marsh Speedwell.                                |   |

## GROUP 8.

*Plants bearing flowers whose predominating colour is some shade of pink or red.*

- |   |                                                                                                                                               |   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | Flowers compound, that is, with many minute flowers, called florets, all grouped into one main flower-head, as in Groundsel and the Thistles. | 2 |
| 1 | Flowers simple, that is, growing singly, and not grouped into a general flower-head.                                                          | 3 |
|   | 2 Probably Hemp Agrimony.                                                                                                                     |   |
| 3 | Each petal in flower growing separately.                                                                                                      | 4 |
| 3 | Corolla of flower all in one piece.                                                                                                           | 5 |
|   | 4 Probably Purple Loosestrife or Great Hairy Willowherb, or perhaps Water Plantain.                                                           |   |
| 5 | Probably Figwort, or Brooklime, or perhaps a Speedwell.                                                                                       |   |

## GROUP 9.

*Plants bearing flowers which are mainly or entirely white, cream, or very slightly tinted.*

- |   |                                          |   |
|---|------------------------------------------|---|
| 1 | Each petal in flower growing separately. | 2 |
| 1 | Corolla of flower all in one piece.      | 8 |

## The Identification of Weeds 41

2	Petals 3.	3
2	Petals 5.	4
2	Petals more than 5.	7
3	Probably Arrowhead or a Water Plantain.	
4	Flowers in umbels.	5
4	Flowers not in umbels.	6
5	Probably Water Dropwort, Water Parsnip, or Marshwort.	
6	Probably Water Crowfoot.	
7	Probably a Water Lily.	
8	Probably one of the Speedwells.	

### GROUP 10.

*Plants bearing flowers whose predominating colour is some shade of yellow.*

1	Petals 5.	2
1	Petals 3 large and 3 small.	5
1	Petals more than 6.	6
2	Flowers 1 in. diameter, or more.	3
2	Flowers less than 1 in. diameter.	4
3	Probably Greater Spearwort or Marsh Marigold.	
4	Probably Lesser Spearwort or Celery-leaved Crowfoot.	
5	Probably Yellow Iris.	
6	Probably Yellow Water Lily.	

### GROUP 11.

*Plants bearing flowers which are mostly greenish or brownish in colour, and very small in size, generally without any petals whatever, and usually more or less inconspicuous.*

1	Plants mainly submerged or floating, with usually only the flowering shoots extending above the water.	2
1	Plants as a rule not submerged or floating, but with their lower parts only in the water.	11
2	Plants wholly floating.	3



2	Plants rooted.	4
3	Probably a Duckweed.	
4	Leaves in whorls of 3.	5
4	Leaves mainly in whorls of 4.	6
4	Leaves in whorls of 6—12.	7
4	Leaves opposite or alternate.	8
5	Probably American Pondweed.	
6	Probably Water Milfoil.	
7	Probably Marestalk.	
8	Flowers in spikes.	9
8	Flowers growing singly.	10
9	Probably one of the Pondweeds.	
10	Probably Water Starwort.	
11	Leaves very large and broad.	12
11	Leaves narrow.	13
12	Probably Great Water Dock.	
13	Leaves flat.	14
13	Leaves cylindrical.	18
14	Flowers in dense cylindrical heads, large and brown.	15
14	Flowers in dense globular heads, greenish.	16
14	Flowers in neither large cylindrical nor dense globular heads.	17
15	Probably a Reedmace.	
16	Probably a Bur-reed.	
17	Probably a Reed or a Sedge.	
18	Probably a Rush or a Bulrush.	

## GROUP 12.

*Plants which never bear flowers at any stage of their life-history.*

1	Plants wholly submerged, or floating.	2
1	Plants erect, neither wholly submerged nor floating.	3
2	Probably one of the Algae.	
3	Probably one of the Horsetails.	

## PART TWO

### INTRODUCTORY NOTE.

For an outline of the arrangement of this Part of the Book, the list of Contents (p. 7) should be consulted. The weeds are classified in four Sections, according to the type of habitat in which they usually occur, and the order of arrangement in each Section is alphabetical, under the usually accepted popular names of the weeds.

Should any difficulty be experienced in finding the plant required, one of the three Indexes at the end of the Book should be referred to, especially No. II, which contains in alphabetical order all the local plant names included in the text.

In cases where the name of the weed is not known, reference may be made to Chapter 4, where a key to identification, and other relevant matter will be found.

It must be remembered that the plant descriptions are necessarily brief, and consequently imperfect. It is hoped, however, that sufficient characters have been given of each species to render its identification moderately accurate. Where greater detail is desired, one of the floras referred to in Appendix 7 should be consulted.

In every case the descriptions follow the same order. The *stems* are described first, next the *leaves*, and then the *flowers*. In some instances the fruits (whether juicy or dry) and the roots, or underground stems, are also included, as these are occasionally of considerable importance in identification and control.

Many weeds appear to show a marked preference for certain types of soil, and whenever necessary a reference to this is made at the foot of the description, where a note concerning the comparative frequency of the weed in Britain as a whole is also given.

The duration of life in each weed is indicated at the end of the descriptive paragraph by letters thus :

A.=Annual. B.=Biennial. P.=Perennial.

The meaning and significance of these terms are discussed in Chapter 1, to which reference should be made.

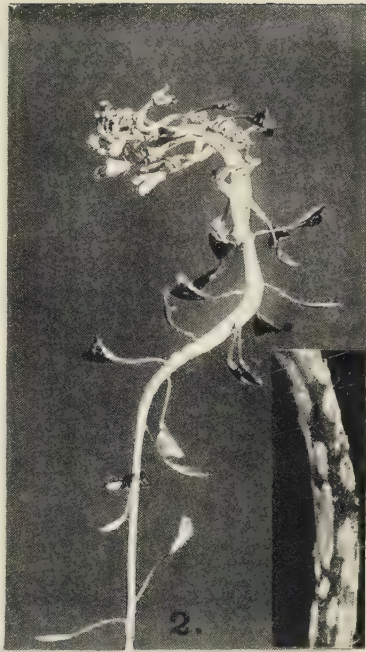
The numbers following the above letters refer to the months during which the weed is usually in flower. Thus 1=January, 2=February, and so on. Hence the abbreviation P. 5—7 indicates that the plant whose description it follows is of perennial duration, and is commonly to be found in flower from May to July inclusive.

Under the heading "Control Measures" the most effective and practical methods at present known for combating each species of weed are stated; or, to economize space, a reference may be given to another species where similar control measures are applicable.

The "Notes" include the following information, where necessary:—1. The properties of the weed, if poisonous or of any economic use. 2. The relation of the weed as a host-plant of insect pests and fungoid diseases which also attack cultivated plants. 3. Any legal regulations affecting the species in question.



1.



2.



3.

## PLATE I.

1. Shepherd's Purse in fruit, normal condition.
2. Ditto, attacked by White Rust Fungus. (Inset: Enlarged portion of stem.)
3. Fool's Parsley. Dwarfed plants frequent in stubbles.





## SECTION I.

### WEEDS OF ARABLE LAND.

**BARBERRY, Common** (*Berberis vulgaris*). Piprage.  
Pipperidge. (Plate V.)

Woody shrub, 4—6 ft. Leaves 1—1½ ins., inversely egg-shaped, alternate, edges spinous. Flowers ¼ in., 6 petals, yellow, in pendulous clusters. Fruits ½ in., oblong, scarlet, containing about two seeds, edible. Hedgerows and copses. Somewhat local, abundant in places. P. 5—6.

**CONTROL MEASURES :** When occurring near arable land, this shrub must be cut down, or uprooted, and burned. This is the only practicable method.

**NOTES :** Not a weed in the ordinary sense, but acts as an alternate host for the Wheat Rust (*Puccinia graminis*, Perc.), which fungus attacks all kinds of cereals, as well as grasses.

Bark possesses purgative and tonic properties, and is used in medicine.

**BARTSIA, Red** (*Bartsia Odontites*). Red Rattle (see also Lousewort).

Stem upright, 6—15 ins., square, branched. Leaves ½—2 ins., lance-shaped, without stalks, upper ones alternate, edges notched. Flowers in leafy spikes, corolla 2-lipped, ½ in., rose-red. Seed capsule ¼ in. Fields, moist meadows, waste places. Semi-parasitic. Thrives on almost any soil, but prefers chalk. A. 6—8.

**CONTROL MEASURES :** Though a common weed of pastures, Bartsia is only likely to be troublesome on neglected arable land. It can easily be kept in check by hoeing, harrowing and cultivating.

**BEDSTRAW, Corn** (*Galium tricornes*). Rough-fruited Bedstraw.

Stems weak, spreading, 8—18 ins. or more in length, rough with small prickles. Leaves lance-shaped, ½—2 ins. long, 6—8 in a ring or whorl, ribs and edges prickly. Flowers very small, greenish-white, each with 4 divisions.

Fruits globular, resembling those of Goosegrass (*G. Aparine*), but granulated instead of bristly. Occurs principally in dry, chalky fields, abundant locally. A. 6—10.

CONTROL MEASURES : Hand and horse hoeing, while the crops are young, together with harrowing in the case of cereals, will keep this weed in check.

**BINDWEED, Black** (*Polygonum Convolvulus*). Bearbind.

Climbing Buckwheat. Cornbind. (Fig. 4.)

Stems 1—3 ft., angular, twining, or trailing. Leaves 1—3 ins., from heart-shaped to arrow-shaped. Flowers very small, in loose clusters, greenish-white, often tinged



Fig. 4

**BLACK BINDWEED.**  
(*Polygonum Convolvulus*.)  
(About  $\frac{1}{2}$  nat. size.)

with red. Fruits 3-angled, bearing a resemblance to those of Buckwheat. Occurs indifferently in all soils, often abundantly. A. 6—10.

CONTROL MEASURES : Frequent and thorough hoeing, and harrowing of young crops in the spring. Root crops offer great facilities for destruction of the weed by hoeing, and a short rotation is therefore an advantage. Largely distributed by the seeds being sown with the crop, and it is thus important to use pure seed.

Spraying, as for Charlock, will largely destroy this weed in cereals.

NOTES : May be injurious to animals owing to mechanical injury from the seeds when fed with corn. Horses are said to have been killed in this way.

**BINDWEED, Common** (*Convolvulus arvensis*). Bearbind. Small Convolvulus. Belbine. (Fig. 5.)

Stems  $\frac{1}{2}$ —2 ft., twining or trailing. Leaves arrow-shaped, 1—3 ins. long. Flowers bell-shaped, 1 in. diameter, rose-coloured or white, usually occurring singly. Fruits roundish, with two cells, often imperfect. Rootstocks white and slender, bearing buds, and creeping great distances underground. Even very small parts root readily, and produce new plants. Abundant everywhere, but prefers heavy soils. P. 6—9.



Fig. 5.

COMMON BINDWEED.

(*Convolvulus arvensis*.)

(About  $\frac{1}{2}$  nat. size.)

**CONTROL MEASURES :** Spreads mainly by its creeping rootstock, each piece of which is capable of producing a plant. It is therefore important to remove the underground stems as completely as possible, collecting and burning them after cultivation. Seeding should be prevented and the roots exhausted by frequent hoeing, whenever con-

ditions permit. Frequent root crops and summer fallowing are advantageous.

NOTES : Often used as Rabbit food.

**BINDWEED, Great** (*Convolvulus sepium*). Large Convolvulus. Morning Glory.

Stems 3—5 ft., twining. Leaves arrow-shaped, 3—5 ins. long. Flowers bell-shaped, 2 ins. diameter, usually pure white, sometimes tinged rose. Fruits globular, about  $\frac{1}{2}$  in. diameter. Rootstocks often tuberous, creeping extensively. Occurs mainly in hedgerows, common. P. 6—8.

CONTROL MEASURES : As previous species.

**BITTERCRESS, Hairy** (*Cardamine hirsuta*).

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft. high, usually more or less hairy. Leaves pinnate, leaflets roundish, in 3—6 pairs. Flowers very small, white, petals 4. Pods about 1 in. long, seeds minute. In moist and shady places, common. A. 4—9.

CONTROL MEASURES : See below.

**BITTERCRESS, Waved** (*Cardamine flexuosa*).

Closely resembling Hairy Bittercress (above), but with a wavy stem bearing more leaves. Very variable in habit. Usually annual or biennial, occasionally perennial. 4—9.

CONTROL MEASURES : Destroy seedlings by spring cultivation, and prevent flowering by the use of the hoe where the nature of the crop permits.

Draining will discourage these, and other moisture-loving weeds.

**BROOMRAPE, Lesser** (*Orobancha minor*). Choke-weed. Strangle-weed.

Stem simple, erect, unbranched, brownish-yellow, often tinged purple.  $\frac{1}{2}$ —2 ft. Leaves absent, brownish scales on stem. Flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. long, yellowish, tinged purple. Seeds very small, abundant. Rootstock swollen. A total

parasite on other plants, principally on Clover. Probably best regarded as an annual. 6—10.

**CONTROL MEASURES:** Seeding must be prevented, by hand-pulling the Broomrapes as soon as they appear. Where a clover crop is badly infested, it is best ploughed up after the first cut, and no clover, sainfoin or lucerne should be grown on the same land for a number of years.

Great quantities of minute seeds are produced and are readily distributed by the wind, but as they are shed before the crop is cut, they are seldom present in clover seed; and when they do occur, are easily separated on account of their small size. Manuring to encourage rapid growth, reduces the risk of injury, and strong growing varieties of clover are less likely to be attacked by the parasite.

**NOTES:** Suspected of poisonous properties, but cattle have been known to eat it without injury.

**BUGLOSS, Field** (*Lycopsis arvensis*). Alkanet. Small Bugloss.

Stems upright, angular,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft. Leaves spear-shaped, wavy, bristly, lower 1—4 ins. long, stalked, upper narrow, without stalks. Flowers  $\frac{1}{4}$  in. diameter, sky blue with white scales. Prefers dry or chalky land, but thrives almost anywhere. A. 6—7.

**CONTROL MEASURES:** See below.

**BUGLOSS, Viper's** (*Echium vulgare*).

Stem stout, 1—3 ft., leafy and bristly, often spotted purple. Root-leaves stalked, 3—7 ins. long, stem-leaves stalkless, lance-shaped. Flowers  $\frac{3}{4}$  in. long, clustered, reddish-purple at first, then bright blue, occasionally white. A common weed on light soils. Usually biennial, rarely annual. 6—8.

**CONTROL MEASURES:** Neither the Field nor Viper's Bugloss are serious weeds, and both may be kept in check



by the ordinary methods of cultivation, and hand-pulling when necessary.

NOTES: An infusion of Viper's Bugloss is used in medicine as a diuretic.

**BUTTERCUP, Common** (*Ranunculus acris*). Crowfoot.

Meadow Buttercup. Bachelor's Buttons.

Stem upright, 1—3 ft., no runners. Leaves with 3—7 divisions, and usually with stalks, except those near the summit. Flowers yellow, 1 in. diameter, stalks round, not furrowed, sepals spreading out beneath petals. Abundant everywhere, but prefers chalk. P. 4—9.

CONTROL MEASURES: The directions given under Creeping Buttercup apply here; except that, having no runners, this species is easier to eradicate.

NOTES: See Section II. for poisonous properties.

**BUTTERCUP, Corn** (*Ranunculus arvensis*). Crowfoot.

Stem erect,  $\frac{1}{2}$ —2 ft., bearing many flowers. Leaves alternate, very variable, deeply cut, segments lance-shaped. Flowers pale yellow,  $\frac{1}{2}$  in. diameter, petals almost upright. Fruits large, covered with prickles. Whole plant much more slender than the common Buttercups. Dislikes dry soils, but often abundant on clays. A. 5—7.

CONTROL MEASURES: Avoid autumn sowing as much as possible. In spring corn the weed can be destroyed by hoeing and harrowing. Being an annual, it can be kept in check if seeding be prevented.

Spraying with a 30 per cent. solution of Sulphate of Ammonia will kill or injure the plants, and at the same time encourage the cereal crop to make rapid growth and choke out the weed.

NOTES: Not recorded as poisonous, but probably possesses similar properties to other species of *Ranunculus*. Partridges will eat the fruits, which most birds avoid.

**BUTTERCUP, Creeping** (*Ranunculus repens*). Crowfoot.  
(Plate VII.)

Stems  $\frac{1}{2}$ —2 ft., partly upright, but usually lying on the ground, with many runners, rooting at intervals. (Fig. 3.) Leaves deeply lobed, middle lobe generally the longest. Flowers yellow, 1 in. diameter, stalks with furrows, sepals spreading beneath petals, hairy. The flowers in this species usually open less widely than in the common Buttercup, and hence present a more globular appearance. Common everywhere, with little or no preference for special soils. P. 5—8.

**CONTROL MEASURES :** Frequent and thorough cultivation is most important, and fallow crops are useful. Loosened plants should be gathered up and burned, or they will root again. Two fallow crops may be taken in succession, in order to clean the land, and mustard may be sown as a smother crop. Dressings of Lime or Basic Slag are beneficial, as the weed flourishes on land which is sour and deficient in phosphates. In gardens the weed must be persistently destroyed before it flowers, and the creeping runners removed as far as possible.

**NOTES :** Occurs on grass land (see Section II) and also on Lawns (see Section III).

**CAMPANULA, Corn** (*Legousia hybrida*). Corn Bell-flower. Venus' Looking Glass. Corn Buebell.

Stem 6—9 ins., usually upright, and branched from below, angular, rough. Leaves oblong, wavy, lower with stalks, upper without, small. Flowers almost stalkless, small bluish inside, lilac without, usually closed in dull weather. Seed-pods angular, about an inch in length, conspicuous beneath the flowers. Fairly common on dry and chalky ground, especially in the eastern counties of England. A. 6—9.

**CONTROL MEASURES :** Of little importance as a cornfield weed, and may be controlled by the ordinary methods of

cultivation and hand pulling, where necessary, to prevent seeding.

**CAMPION, Bladder** (*Silene inflata*). White-bottle. Crackers.

Stem erect, 2—3 ft., branched, bluish-white, usually smooth, sometimes covered with soft hairs. Leaves somewhat egg-shaped, 1—3 ins. long, bluish, opposite. Flowers about  $\frac{3}{4}$  in. diameter, white, drooping, often imperfect, not all producing seed, calyx bladder-like. Fruits capsular. Prefers chalk, but a common weed on all soils. P. 6—8.

**CONTROL MEASURES :** Seed frequently introduced when sowing temporary grasses or clover, therefore only pure seed must be used. It is most important to prevent seeding, and hand-pulling of the plants is the only practicable method.

**NOTES :** The larvae of several species of moths feed on this plant, chiefly on the seeds within the capsules, but are not sufficiently numerous to have any appreciable effect.

**CAMPION, Red** (*Lychnis diurna*). Red Robin. Cuckoo-flower. Billy-buttons.

Stem upright, 1—3 ft., branched. Leaves egg-shaped, pointed, those from root 3—5 ins., upper ones narrow. Flowers 1 in. diameter, petals 5, red or rose-coloured, each one cleft. Fruit a capsule, almost globular, seeds small, numerous. Many plants bear stamens only, and consequently produce no seeds. A common weed in most places, but rare in certain regions. P. 5—6.

**CONTROL MEASURES :** As Bladder Campion (above).

**CAMPION, White** (*Lychnis viscaria*). White Robin. Cuckoo-flower, etc.

The whole plant closely resembles the Red Campion (above), but the flowers are usually pure white, and open widely and become fragrant in the evening. Often an abundant weed on chalky ground. P. (or B.) 6—9.

CONTROL MEASURES : As Bladder Campion (above).

**CANDYTUFT, Common** (*Iberis amara*).

Stem  $\frac{1}{2}$ —1 ft., upright, branched, ribbed. Leaves lance-shaped, pointed, 1—2 ins., stalkless, with a few rounded teeth along edges. Flowers  $\frac{1}{4}$  in. diameter, usually pure white, occasionally tinged purple, petals 4. Pods about  $\frac{1}{2}$  in. long. Thrives on chalk, but seldom troublesome elsewhere. Probably not indigenous. A. 6—8.

CONTROL MEASURES : Hoeing and hand-pulling the plants before they seed.

**CARROT, Wild** (*Daucus Carota*). Bird's-nest. (Plate IV.)

Stem 1—2 $\frac{1}{2}$  ft., branched, with furrows. Leaves finely cut, leaflets numerous, with narrow segments. Flowers in umbels, very small, the central one usually dark purple, the rest white. Root carrot-like, yellowish, sweet. Common everywhere, but has a preference for chalk. B. 6—8.

CONTROL MEASURES : May be kept in check by good cultivation and the thorough cleaning of root crops.

NOTES : Chiefly a pasture weed (see Section II.).

**CHAMOMILE, Corn** (*Anthemis arvensis*). Dog's Chamomile.

Stem 1—2 ft., upright, much branched, hairy. Leaves alternate, deeply cut, segments also deeply cut, hairy. Flower-heads 1—1 $\frac{1}{2}$  ins. diameter, solitary, the central disc yellow, the outer florets pure white. Sometimes a common weed on light soils, but of rather local occurrence. A. 6—8.

CONTROL MEASURES : Prevention of seeding by hoeing or pulling up the plants. In corn crops, dressing with finely ground Kainit, 8 cwt. per acre, is effective. Prevalent on poor land, deficient in lime. Apply two tons of lime and four to six cwt. of superphosphate per acre.

NOTES : No poisonous effects have been recorded, but the seeds are known to contain hydrocyanic acid. If eaten by cows is liable to give a disagreeable flavour to milk and butter.

**CHAMOMILE**, Wild (*Matricaria Chamomilla*). Dog's Chamomile. Mayweed.

Stem 1—2 ft., upright, much branched, closely resembling Corn Chamomile, but smooth instead of hairy. Leaves alternate, also smooth, deeply divided into narrow segments. Flower-heads about  $\frac{3}{4}$  in. diameter, the central disc yellow, becoming conical, outer florets pure white, whole plant aromatic. Fairly common, but appears to dislike chalky soils. A. 6—8.

CONTROL MEASURES : (as previous species).

NOTES : Not poisonous, but will flavour milk and butter, if eaten by cows to any extent.

Used sometimes in medicine, in the form of a liquid extract of the flowers ; possessing sedative, tonic, and carminative properties.

**CHARLOCK**, Common (*Brassica Sinapis*). Wild Mustard.

Kilk. Ketlock. Carlock. Runch. (Wild Radish, White Mustard, and Black Mustard are often incorrectly called Charlock.) (Plates II. and III.)

Stem 1—2 ft., branched, rough with small bristles. Leaves from egg-shaped to lyre-shaped, toothed. Flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. diameter, clear yellow, petals 4. Pods  $1\frac{1}{2}$ —2 ins., spreading outwards, angular, surmounted by awl-shaped beak, latter sometimes with one seed. (Plate III.) Abundant everywhere, but especially on the heavier soils. A. 5—8.

CONTROL MEASURES : Use seed quite free from Charlock as an impurity. Destroy seedlings in young crops by harrowing and horse-hoeing. When the weed is in the







## PLATE II.

1. Leaves of Charlock attacked by the Turnip Flea Beetle. The two lower leaves show also the mines which are made by the larvæ of this insect. (Inset: The Beetle enlarged.)
2. Roots of Charlock showing swellings caused by larvæ of the Cabbage and Turnip Gall Weevil. (Inset: The Weevil enlarged.)

first rough leaf stage (*i.e.*, in May), it may be destroyed by chemical means, as follows :—

- (1) Spray with a three per cent. solution of Copper Sulphate, for cereals, and a two per cent. solution for peas and beans.
- (2) Spray with a fifteen per cent. solution of Iron Sulphate.
- (3) Spray with a 30 or 35 per cent. solution of Ammonium Sulphate. This has the great advantage of stimulating the growth of the crop, while scorching up the weed.
- (4) When leaves are wet, dust with finely ground Kainit, at the rate of 6 cwt. per acre. This also manures the crop at the same time.

The first and last methods are considered the most successful. A fine misty spray, and a still day are of the utmost importance. Charlock may also be sprayed with Copper Sulphate at the flowering stage, but a stronger solution (4 per cent.) should be used. Dry spraying, with 20 lbs. Copper Sulphate per acre, has given good results.

NOTES : This plant forms a host for several serious pests, viz. :—The Turnip Flea Beetle, Cabbage and Turnip Gall Weevil, Cabbage Root Fly, Diamond Back Moth, Crane Fly larvae (Leather Jackets), and the Club-Root Fungus. (Plate II.)

Charlock has similar properties to Mustard and the seeds are dangerous if eaten by stock. The rest of the plant is harmless and may be safely eaten by animals before flowering. The seeds have been found occurring in oil cake, with serious results to horses and cattle.

**CHICORY, Wild** (*Cichorium Intybus*). Succory.

Stem 1—3 ft., alternately branched, grooved, bristly. Lower leaves cut, with lobes pointing backward, upper lance-shaped or oblong, without lobes. Flower-heads 1—1½ in. diameter, bright blue, handsome. Appears to prefer

chalky and gravelly fields and waysides, widely distributed.  
P. 7—10.

**CONTROL MEASURES :** Avoid sowing grass or clover seeds that are not quite free from the seeds of Chicory. Roots turned up during cultivation should as far as possible be collected and burnt. Continual hoeing is necessary, and frequent crops of roots or potatoes are therefore useful.

**NOTES :** Chicory has been, and still is, cultivated for its roots which are ground up for mixing with coffee. It has also been used in medicine and possesses laxative and tonic properties.

**CHICKWEED, Common** (*Stellaria media*). White Birds-eyes.

Stems partly prostrate, the ends rising,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., brittle, glossy, with a line of hairs alternating from side to side. Leaves opposite, egg-shaped, pointed, lower with stalks, upper stalkless. Flowers small, white, petals 5, very deeply divided, appearing like 10. A very variable plant. Abundant everywhere. A. May be found in flower in every month in the year.

**CONTROL MEASURES :** Deep ploughing, and thorough surface cultivation, especially in hot weather. Hoeing and hand-pulling in gardens, and where the weed grows amongst root crops and potatoes. Where growing freely, the weed indicates excess of nitrogen, and shortage of lime and phosphates. The land should be manured accordingly.

**NOTES :** Possesses no poisonous properties and is readily eaten by stock, but liable to cause serious indigestion in sheep, and is frequently fatal to lambs. Pigs eat it without harm, however; and it has value as a green manure, containing ten per cent. of Potash.

The species of *Stellaria* form alternate hosts for the fungus causing Carnation Rust.

**CHICKWEED, Mouse-ear** (*Cerastium vulgatum*). Mouse-ears.

Stem 6—10 ins., hairy, partly prostrate. Leaves small, opposite, egg-shaped, hairy. Flowers small, white, petals 5, deeply cut, about same length as sepals. Abundant everywhere. A., B., or P. 4—9.

**CONTROL MEASURES :** As previous species.

**NOTES :** Also occurs on Lawns (see Section III.).

**CINQUEFOIL, Creeping** (*Potentilla reptans*). Five-leaves.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., creeping, rooting. Leaves made up of 5 leaflets, latter inversely egg-shaped, edges notched. Flowers  $\frac{3}{4}$  in. diameter, petals 5, yellow. Seldom troublesome on arable land, preferring waysides, pastures, etc. P. 6—8.

**CONTROL MEASURES :** The creeping runners of this plant make it difficult to eradicate. That gathered up by the harrows during cultivation should be burned, and deep ploughing is advisable, to bury the roots. It should be reduced by hoeing whenever possible, and two root crops in succession are useful for this purpose.

**COLTSFOOT, Common** (*Tussilago Farfara*). Horse-hoof. Clayweed. Foalfoot. Coughwort.

Stems creeping underground, rooting and budding at intervals. Leaves 3—9 ins. across, heart-shaped, angled, often cobwebby on upper surface, cottony beneath, appearing after flowers have withered. Flower-heads 1—1 $\frac{1}{2}$  ins. diameter, yellow, occurring singly on stalks 4—12 ins. high, latter bearing several scales closely pressed to stalk. Fruiting head with feathery down, resembling that of Dandelion. Common everywhere, but prefers moist, heavy ground. P. 3—4.

**CONTROL MEASURES :** Cut flower stems early to prevent seeding. Cut leaves in May and June to weaken the root-

stock. Drainage on wet land, followed by summer fallow, deep ploughing and getting out as many roots as possible. Grow Mustard or Vetches as a smother crop, and next year eradicate surviving plants by hoeing.

Use nitrogenous manures to encourage the crop to choke out the weed. Laying the land down to permanent pasture destroys it. It is reduced by spraying with a 4 per cent. Copper Sulphate solution.

NOTES : Contains no poisonous properties ; but is employed in medicine as a cough remedy.

The underground stems provide food for such pests as the larvae of Swift Moths, Cockchafers, Wireworms, etc.

### **CORN COCKLE, Common (*Lychnis Githago*).**

Stem 2—3 ft., branched, clothed with white hairs. Leaves opposite, narrow, lance-shaped, 2—4 ins. long, stalkless. Flowers  $1\frac{1}{2}$ —2 ins. diameter, petals 5, purple, with black lines, calyx-segments narrow, and very long. Capsules with 5 teeth. Grows indifferently on all soils, common. A. 6—8.

CONTROL MEASURES : Harrow and cultivate well in the Spring, to destroy seedlings, and avoid Autumn sowing. Hand-pull large plants, and do everything possible to prevent seeding, or the seeds being harvested with the crop. Frequent root crops offer facilities for eradicating the weed. Spraying with Copper Sulphate or Iron Sulphate as for Charlock will greatly injure Corn Cockle and prevent seeding. Only sow seed that is quite free from Corn Cockle.

NOTES : Contains a poisonous principle, present chiefly in the seeds. The plant itself seems to be harmless and is unlikely to be eaten by animals ; but the seeds, when ground up in flour, have proved fatal to all domestic animals, and also to man when present in bread. Thus Corn Cockle is a very dangerous weed, and every effort should be made to eradicate it.



**CORNFLOWER, Common** (*Centaurea Cyanus*). Blue-bottle.

Stem 1—3 ft., branched, grooved, leafy, cottony, rather slender. Leaves 2—4 ins., stalkless, narrow, cottony, lower ones toothed. Flower-heads 1 in. diameter, outer florets bright blue, central disc purplish. Plant seldom occurs in sufficient quantity to cause much trouble. A. or B. 6—9.

**CONTROL MEASURES:** Growing on sandy soils, deficient in humus, may be discouraged by the use of organic manures. Remarks on previous species apply here.

**CORN SALAD, Common** (*Valerianella olitoria*). Lamb's Lettuce.

Stem  $\frac{1}{2}$ —1 ft., furrowed, brittle, repeatedly forked. Leaves 1—3 ins., narrow-oblong, lower ones stalked, upper stalkless and partly clasping stem. Flowers very small, pale lilac, densely clustered in roundish heads. A typical weed of chalk districts, but widely distributed. A. 4—6.

**CONTROL MEASURES:** Not likely to be a troublesome weed, if seeding can be prevented. The usual surface cultivation and hoeing in the Spring should keep it in check.

**COW-WHEAT, Purple** (*Melampyrum arvense*).

Stem 1—2 ft., branched, upright, four-cornered. Leaves 1—3 ins., lance-shaped, with rough edges, slightly downy above and below. Flowers  $\frac{3}{4}$  in. long, two-lipped, variegated with rose-pink, yellow and purple. Seeds shaped like grains of wheat, black. Occurs locally in eastern counties of England, and in Isle of Wight. A. 7—8.

**CONTROL MEASURES:** A short rotation, with frequent root crops and good surface cultivation, should keep this plant down where it is likely to occur. Mustard, vetches, or lucerne might be used to smother it.

**NOTES:** Suspected of poisonous properties, but not unless large quantities are eaten. The seeds, when present



in wheat, are said to give the flour a purplish tint and an objectionable taste and smell.

**CRANE'S-BILL, Cut-leaved** (*Geranium dissectum*). Wild Geranium. Jagged-leaved Crane's-bill.

Stems  $\frac{1}{2}$ —2 ft., spreading, forked, hairy. Leaves very deeply divided, almost to the base, segments usually 5—7, downy. Flowers  $\frac{1}{4}$ — $\frac{1}{2}$  in. diameter, petals 5, bright pinkish-red, not much longer than green sepals. Occurs mainly on fairly stiff soils, common. A. 5—9.

CONTROL MEASURES : See below.

**CRANE'S-BILL, Dove's-foot** (*Geranium molle*). Wild Geranium. (Fig. 15.)

Stems  $\frac{1}{2}$ —1 ft., often partly prostrate, the ends ascending. Leaves 1—2 ins. diameter, roundish, kidney-shaped, 7—9 lobes, segments usually three-cut at the ends. Flowers about  $\frac{1}{2}$  in. diameter, petals 5, two-cleft, rosy-purple or pink. Common everywhere, but prefers light soils. A. 4—9.

CONTROL MEASURES : See below.

**CRANE'S-BILL, Small** (*Geranium pusillum*). Wild Geranium.

Stem  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., spreading, often prostrate, reddish, clothed with soft short down. Leaves 1—2 ins. diameter, roundish, kidney-shaped; rather deeply lobed, lobes 5—7, ends three-cut. Flowers about  $\frac{1}{4}$  in. diameter, petals 5, notched, rose-coloured. Whole plant very closely resembling the Dove's-foot Crane's-bill (above). Fairly common, except on heavy ground. A. 6—9.

CONTROL MEASURES : Occur chiefly as weeds in rotation grasses and clovers, in which hand-pulling is the best method of removing, or hoeing when the crop is young. Care should be taken that the seeds sown do not contain Crane's-bill as an impurity.

NOTES : The Dove's-foot Crane's-bill has been largely

used in medicine in the past, and possesses tonic and astringent properties.

The Seeds Act requires dealers to declare the presence of Crane's-bills in seeds offered for sale, if exceeding 1 per cent. in clovers or 2 per cent. in grasses. The sale or use of seed containing more than 5 per cent. of weed seeds is illegal.

**CRESS, Common Swine's** (*Senebiera Coronopus*). Wart Cress. Buck's-horn.

Stems branched, prostrate, a foot or so in length, often less. Leaves deeply divided, free from hairs, usually almost flat upon the ground. Flowers in dense clusters, very small, petals 4, white. Root tapering. An abundant weed, preferring heavy soils. Sometimes almost confined to gateways and the neighbourhood of manure heaps. A. or B. 6—9.

CONTROL MEASURES : As following species.

**CRESS, Thale** (*Sisymbrium Thaliana*).

Stem erect,  $\frac{1}{2}$ —1 ft., branched, thin, bearing few or no leaves. Leaves mainly from root, oblong to lance-shaped, toothed, with stalks, those from stem narrow, stalkless, often without teeth. Flowers barely  $\frac{1}{8}$  in. diameter, petals 4, white. Seed-pods  $\frac{3}{4}$ —1 in., angular, slender, curved, carrying many small seeds. A common weed on dry soils. A. 4—5, and again 9—10.

CONTROL MEASURES : Neither this nor the previous species are serious arable weeds, and where they occur may be combated by hoeing and surface cultivation.

**CUDWEED, Marsh** (*Gnaphalium uliginosum*). Cotton weed.

Stems 2—8 ins., upright, branched, base of plant more or less prostrate, whole plant cottony, whitish. Leaves narrow lance-shaped, cottony on both sides. Flower-heads  $\frac{1}{8}$  in. in clusters, yellowish-brown, the florets very small

and inconspicuous. Common in moist places on light, sandy ground, but avoiding chalk. A. 7—9.

CONTROL MEASURES : See below.

**CUDWEED, Upright** (*Filago germanica*). Cudwort.  
Downweed.

Stem  $\frac{1}{2}$ —1 ft., strikingly erect, forked. Leaves lance-shaped,  $\frac{1}{2}$ —1 in., wavy. Flower-heads occurring terminally and in the forks,  $\frac{1}{2}$  in. diameter, globular, brownish. Whole plant whitish and cottony. Frequent on dry and chalky soils. A. 7—8.

CONTROL MEASURES : As with all annuals, the chief thing is to prevent seeding. Hoeing is the most effective method. As the former species is partial to wet ground, draining would tend to reduce it.

NOTES : Sometimes used in medicine in the form of an infusion or extract. Possesses astringent properties.

**DANDELION, Common** (*Taraxacum vulgare*). One-o'clocks.

Stemless, but flower-stalks a foot or more in height. Leaves free from hairs, with backward-pointing lobes. Flower-heads 1—2 ins. diameter, bright yellow, occurring singly on tubular stalks, juice milky. Seeding-heads large, globular, feathery. Root long and thick, blackish. Abundant everywhere, but prefers chalky soils. P. 3—10.

CONTROL MEASURES : The long tap root renders eradication by hoeing a slow and difficult process. The roots should be removed as completely as possible with a special tool, called a "dandelion grubber." Every effort should be made to prevent seeding, or even flowering, and hoeing or spudding is chiefly useful for this purpose. Spraying, as for Charlock, will destroy the flowers and leaves of Dandelions, without serious injury to a corn crop. The roots, however, are uninjured, and soon sprout again, so that spraying is hardly worth the expense, although it may prevent seeding.

NOTES : The root is largely used in medicine, having a tonic and diuretic action. In some districts the roots are collected in large quantities and sold to drug manufacturers.

See also Sections II and III.

**DEADNETTLE, Henbit** (*Lamium amplexicaule*).

Stem  $\frac{1}{2}$ —1 ft., branched. Leaves somewhat heart-shaped, broad, with rounded teeth, about  $\frac{3}{4}$  in. long, lower ones with stalks, upper stalkless, embracing the stems. Flowers  $\frac{1}{4}$ — $\frac{3}{4}$  in., bright rose, often imperfect, sometimes never opening. A typical weed of light and chalky ground, often abundant in sandy waste areas. A. 5—8.

CONTROL MEASURES : As following species.

**DEADNETTLE, Red** (*Lamium purpureum*). Dognettle.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., square, branched, lower parts often almost prostrate, purplish or green, hairy. Leaves 1—2 ins., heart-shaped, with rounded teeth, and longish stalks, upper ones often crowded together. Flowers purplish-red,  $\frac{1}{2}$ — $\frac{3}{4}$  in., two-lipped. Root fibrous. Common everywhere, but appears to be less so on chalk. A. 1—12.

CONTROL MEASURES : This and the previous species should be dealt with by the constant use of the hoe, where conditions permit, such as in root crops and young corn. Seedlings will be largely destroyed by Spring cultivation.

**DEADNETTLE, White** (*Lamium album*). Dognettle.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., square, branched, lower parts rooting. Leaves 1—3 ins., heart-shaped, with rounded or notched edges, pointed, all with stalks. Flowers  $\frac{1}{2}$ —1 in., two-lipped, white. Rootstock creeping, rooting at intervals. Common in southern Britain. P. 5—12.

CONTROL MEASURES : The same methods as for the previous species should be adopted ; but as this is a perennial, special efforts should be made to remove as much of the creeping underground stem as possible.

**DOCK, Broad-leaved** (*Rumex obtusifolius*). Docken.

Stem 2—3 ft., upright, branched, with furrows. Root-leaves up to a foot in length, broad, with heart-shaped bases, stem-leaves much narrower, all somewhat wavy and more or less notched. Flowers greenish, in terminal clusters. Fruiting heads green, then brown, fruits triangular, covered by the enlarged remains of the flowers. Root large and tapering, deep brown. Abundant on most soils, but partially avoids chalk. P. 7—9.

**CONTROL MEASURES:** The only way of dealing with Docks in corn crops is the laborious method of hand-pulling when the ground is wet, or lifting out the roots with the docking iron. This should be continued as late as possible. Steam ploughing and cultivating does much to reduce docks, but the roots must be collected and burned. Fallow crops should be taken frequently and Autumn hoeing is important to prevent the seedlings becoming established. Care should be taken that Dock seed is not sown with the crop, and every effort made to prevent the weeds reaching the seeding stage. Spraying with Copper or Ammonium Sulphate will prevent seeding and destroy the leaves.

**NOTES:** Docks serve as alternate host plants for the Bean Aphis and Mangold Fly, and also encourage subterranean larvæ such as those of the Swift Moths.

The Ministry of Agriculture has power to serve a notice on the occupier of land, requiring the destruction of Docks within a specified time and in a given manner. The Seeds Act, 1920, requires dealers to declare the presence of Docks and Sorrels in seeds offered for sale, if exceeding one per cent. in clovers and two per cent. in grasses. If more than five per cent. of weed seeds are present, the seed may not be sold or used for sowing.

**DOCK, Curled** (*Rumex crispus*). Docken.

Stem 1—3 ft., upright, branched. Leaves 6—9 ins., lance-shaped, pointed, conspicuously wavy. In general appearance most of the commoner Docks bear a striking



resemblance one to another, and certain identification of the various species, sub-species and hybrids is a difficult matter even for the expert. Details are not possible here, but the present species is usually less stout than the one above, and has rather distinctive foliage. Abundant on all soils. P. 6—10.

CONTROL MEASURES : As previous species.

**DOCK, Sharp** (*Rumex conglomeratus*). Docken. Clustered Dock.

This species seldom occurs on arable land, preferring damp meadows. In general appearance it is similar to the two above named, but its whorls of flowers are usually wider apart, and the leaves run almost to the summits of the stems. Its average height is from 2—3 ft. P. 6—10.

CONTROL MEASURES : As previous species.

**DODDER, Clover** (*Cuscuta Trifolii*). Strangleweed.

The Clover Dodder is probably the most troublesome of its tribe in this country, but Flax and other plants are attacked by closely related species. All the Dodders are leafless total parasites, taking all their food supplies from the plants to which they attach themselves. They consist almost entirely of winding, threadlike stems, usually reddish in colour, bearing at intervals small clusters of tiny whitish or pink-tinged flowers, and clinging tightly by means of suckers to their hosts. Dodders are plants of only one season's duration, and reproduce themselves abundantly by seeds. During the summer, however, broken portions of the stems may attach themselves to new hosts, and thus aid in their dissemination. Dodder-roots die away immediately after germination of the seed, and connection with the soil is thereafter at an end.

CONTROL MEASURES : Sow only pure seed, guaranteed free from Dodder. Patches of clover, etc., found to be infested should be cut, allowing a generous margin, and burned on the spot with the help of a thick layer of straw, chaff, etc., sprinkled with paraffin; the whole patch being



well burnt over. If the surface soil from such patches be skimmed off and burnt, destruction is more certain. Infested Clover or Lucerne must not be given to stock, as the Dodder seeds resist digestive action and are again distributed with the manure. Moreover they will germinate after lying in the soil at least five years. In severe cases the crop should be ploughed in before the Dodder seeds are formed. Spraying with a 15 per cent. solution of Iron Sulphate has been found successful, and is said to kill the Dodder but only temporarily blacken the Clover. The liquid requires to be applied forcibly with a sprayer. No leguminous crop must be grown on infested land for a number of years.

NOTES : The Seeds Act, 1920, requires dealers to declare the presence of Dodder in seeds offered for sale, if the number exceeds one seed in four ounces of Red Clover, Lucerne, and Flax; and one seed in two ounces of White and Alsike Clover. Didders are suspected of being poisonous.

**FORGET-ME-NOT, Field** (*Myosotis arvensis*). Scorpion Grass. Birds'-eyes.

Stems  $\frac{1}{2}$ —1 ft., branched low down, mainly erect, hairy, slender. Leaves 1—2 ins., oblong, the lower broader and blunter, with stalks, the upper narrower and pointed, stalkless. Flowers very small, barely  $\frac{1}{8}$  in. diameter, divided into 5 lobes, pale blue. The fruit itself is smooth, but the calyx is covered with hooked bristles, and attaches itself readily to passing animals, etc. Frequent everywhere in cultivated ground. A. or B. 6—8.

CONTROL MEASURES : See below.

**FORGET-ME-NOT, Yellow-and-Blue** (*Myosotis versicolor*). Scorpion Grass. Birds'-eyes.

Stems 3—9 ins., often branched low down, erect. Leaves  $\frac{1}{2}$ —1 in., narrow-oblong, hairy, slightly pointed, usually alternate, often opposite towards the summit. Flowers smaller than in above species, seldom exceeding  $\frac{1}{10}$  in.

diameter, opening pale yellow, then passing to blue, with yellow throat. The fruits are small and black, the calyx covered with hooked hairs to aid in dissemination. A common weed in dry places. A. 4—7.

**CONTROL MEASURES :** Both species of *Myosotis* may be eradicated by hand and horse hoeing in the Spring, and the ordinary methods of cultivation. It is important to prevent seeding.

**FUMITORY, Common** (*Fumaria officinalis*). Smokeweed.

Stem  $\frac{1}{4}$ —1 ft., branched, more or less spreading. Leaves finely divided into very narrow segments, grey-green in colour, giving the whole plant a hazy or smoky appearance. Flower in clusters occurring terminally or opposite to the leaves, rose-pink to deep purple, with short spurs, petals 4, more or less united, forming a sort of lipped tube. A common weed on chalk, but less so on other soils. A large number of closely related species and varieties have been recorded. A. 5—9.

**CONTROL MEASURES :** Although often abundant on arable land, this weed is not very harmful. Hoeing, harrowing and cultivating in late Spring should keep it in check.

**NOTES :** Not poisonous, but has no feeding value. An infusion of the herb is used in medicine as a tonic and aperient.

**GARLIC, Broad-leaved** (*Allium ursinum*). Ramsons. Gipsies' Wild Onions.

Stemless, but flower-stalk reaching a height of  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., trinangular, bearing no leaves. Leaves usually 2 in number, 3—7 ins. long, bright green, from egg-shaped to lance-shaped, with stalks 2—3 ins. long, embracing the base of the flower-stalk. Flowers in an umbel, flat at the top, white with pointed divisions. Whole plant smelling strongly of garlic, especially when crushed. P. 4—6.

**CONTROL MEASURES :** As following species.

**GARLIC, Crow** (*Allium vineale*). Wild Onions. Crow's Onions.

Flower-stalk  $1\frac{1}{2}$ —2 ft., cylindrical. Leaves  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., rounded, grooved, embracing the flower-stalk. Flowers  $\frac{1}{8}$  in., arranged in an umbel, pale rose-pink or greenish, often giving place to small green or purplish bulbils, oval and pointed, which assist in disseminating the plant. Bulbs green. Plant very strong-smelling. Common in dry fields, etc. P. 6—7.

**CONTROL MEASURES :** A serious pest and very difficult to eradicate. The hoeing of root crops, alternating with the growth of green crops that will smother the weed, are the most important measures. Catch crops of mustard, preceding and following mangolds or potatoes, will greatly reduce it; while green crops, as maize or vetches, are very helpful. Experiments at Woburn have shown that spraying with carbolic acid will greatly reduce Garlic. Spraying is done with a Charlock sprayer when no crop is on the land, and if the right strength be used, will not poison the ground for the crop which follows. Fifteen gallons of 33 per cent. soluble Carbolic Acid should be mixed with a hundred gallons of water. On a small scale, digging out the bulbs, and pulling them up in June, when near the surface, is the surest method of eradication.

**NOTES :** The Onion Rust fungus attacks this plant. Also occurs in pastures. The other species of Garlic require similar treatment.

**GARLIC, Field** (*Allium oleraceum*). Wild Garlic. Wild Onions.

Flower-stalk  $\frac{1}{2}$ —2 ft., cylindrical. Leaves rounded, sheathing the flower-stalk, varying much in size. Flowers in a loose umbel, reddish or green, sometimes replaced by bulbils. Bulbs many, purple. Whole plant strongly smelling of garlic. Used in cookery. Occurs locally in cornfields, etc., seldom giving much trouble. P. 7—8.

**CONTROL MEASURES :** As previous species.

**GOATSBEARD, Common** (*Tragopogon pratensis*). John-go-to-bed-at-Noon.

Stem  $1\frac{1}{2}$ —2 ft., upright, stout, leafy, often branched towards the summit. Leaves narrow, tapering, smooth, dilated at the base. Flower-heads 1—2 ins. diameter, yellow, occurring singly at the summits of the stalks. Seeding heads very large when expanded, feathery as in Dandelion, but much larger. Whole plant grey-green, with a milky sap. Common in southern Britain, but mainly in grassland and waste places. Usually a biennial. 6—7.

**CONTROL MEASURES:** Seeding must be prevented, and the plants reduced by hoeing and surface cultivation in the Spring.

**NOTES:** This is one of the numerous hosts of the fungus causing Lettuce mildew.

**GOLD OF PLEASURE** (*Camelina sativa*). Oilseed.

Stems 2—3 ft., erect, branched towards the summit. Leaves 1—3 ins., lance-shaped, arrow-shaped at bases. Flowers small, seldom exceeding  $\frac{1}{8}$  in. diameter, petals 4, upright, yellow. Seed-pods about  $\frac{1}{4}$  in., inversely heart-shaped, containing few seeds. An immigrant weed, occurring mainly in and about Flax fields, seldom a serious pest. A. 6—7.

**CONTROL MEASURES:** Not an important weed, and where it occurs may be kept in check by the ordinary methods of cultivation.

**NOTES:** Used on the Continent for fodder, thatching, broom making, etc. An oil is also produced from it.

**GOOSEFOOT, Red** (*Chenopodium rubrum*). Wild Spinach.

Stem 1—3 ft., reddish, usually upright. Leaves roughly triangular to oval, with large blunt lobes and notches, but very variable in size and shape. Flower-spikes erect, intermixed with leaves, distantly resembling those of Dock, individual flowers tiny, without petals, greenish. Very common about manure heaps, etc. A. 8—9.

**CONTROL MEASURES:** See below.

**GOOSEFOOT, White** (*Chenopodium album*). Fat Hen.  
Wild Spinach.

Stem 1—3 ft., furrowed, branched, erect. Leaves somewhat egg-shaped, angled, or triangular, pointed, usually about 3 ins. long, but very variable. Flower-spikes usually branched, rather leafy below, greenish. Whole plant similar in habit to Red Goosefoot (above), but covered with a whitish meal, or powder. Abundant in all places. A. 7—9.

**CONTROL MEASURES:** Spring cultivation, hoeing and harrowing, should destroy most of the seedlings. Introduction of the seed with the crop should be guarded against. Seeding must be prevented, by hand-weeding if necessary, as the weed is very injurious if allowed to spread.

**NOTES:** This is a nutritious plant, and is grown as food for pigs and sheep in Canada, where it is called "Pig Weed." It serves as a host plant for both the Bean Aphis and Mangold Fly.

**GOOSEGRASS, Common** (*Galium Aparine*). Cleavers.  
Scratchgrass.

Stems from 1—4 ft. or more, branched, very weak, rough, using other plants for support. Leaves  $\frac{1}{2}$ — $1\frac{1}{2}$  ins., lance-shaped, narrow, growing in a circle of 6—8 round the stem, rough, with a fringe of bristles. Flowers in loose clusters, each flower with four segments, white. Fruits rather large, globular, covered with hooked bristles. Common everywhere, but appears to prefer heavy ground. A. 5—8.

**CONTROL MEASURES:** Be sure the fruits are not present in seed corn, clover, etc., or in manure applied to the land. Thorough cultivation, with horse and hand hoeing in the Spring is the best method of control. Farm animals, dogs, etc., are very liable to distribute the fruits.

**GOUTWEED, Common** (*Ægopodium Podagraria*).  
Bishop's-weed. Herb Gerard. Goatweed.

Stem stout, 1—2 ft., upright, furrowed, hollow, branched towards the summit. Leaves 4—5 ins., smooth, dark



green, much divided, with broad segments, leaflets egg-shaped, notched. Flowers in large terminal umbels, petals 5, white. Very common, and often troublesome, in shady places, spreading rapidly by means of its creeping rootstocks. P. 5—8.

CONTROL MEASURES: Should be hoed or spudded out wherever opportunity offers, and the spreading underground stems, turned up during cultivation, collected and



Fig. 6.

ANNUAL MEADOW

GRASS.

(*Poa annua*.)

(About  $\frac{1}{2}$  nat. size.)

burnt. Liming would probably reduce it, and on wet land draining would have a beneficial effect. Successive crops of potatoes, well manured and thoroughly hoed, might also be tried.



NOTES : Used in medicine, both internally and externally, as a remedy for gout, as the name implies.

**GRASS, Annual Meadow** (*Poa annua*). (Fig. 6.)

Stems slender, 6—12 ins., more or less prostrate, rooting. Leaves rather blunt, often wavy. Flower-clusters 1—3 ins. long, somewhat triangular in outline, green or purplish. Root fibrous. Common on most soils, but partially avoids chalk. A. 1—12.

CONTROL MEASURES : Ploughing and the usual tillage operations do much to keep this weed in check, and the seedlings are destroyed by harrowing and hoeing, where the nature of the crops permit. In gardens, persistent hoeing and hand-pulling is necessary.

NOTES : Objectionable as a weed, but in its right place a useful and nutritious plant.

**GRASS, Black Bent** (*Alopecurus agrestis*). Black Couch.

Black Twitch. Slender Fox-tail.

Stem 1—2 ft., erect, prostrate below, roughish above. Leaves quite flat, upper surface and edges rough. Flower cluster 2—3 ins. long, in shape resembling a slender fox-tail, usually green, often tinged purple. A common weed on clays and heavy ground. Often very troublesome. A. 5—10.

CONTROL MEASURES : As following species.

**GRASS, Common Bent** (*Agrostis vulgaris*). Fine Bent.

Stems  $\frac{1}{2}$ —2 ft., erect, smooth, often partly prostrate, and rooting at the knots. Leaves flat, rough, not very long. Flower-clusters 1—3 ins., spreading, more or less oval, but very variable, usually reddish-purple. Rootstock creeping. Common everywhere, but chiefly in grassland. P. 6—9.

CONTROL MEASURES : The chief thing is the removal of the creeping stems. Forking out may be practised on a small scale, while in field cultivation the roots and stems gathered up by the harrow should be collected and burnt.

Crops of maize, vetches, or mustard tend to reduce the weed by choking it out.

**GRASS, Couch** (*Agropyron repens*). Twitch. Quitch. Squitch. Creeping Wheat-Grass. (Fig. 7.)

Stems 1—4 ft., upright, leafy, free from hairs. Leaves flat, occasionally rounded, spreading, upper surface and edges usually rough. Flower-spikes 3—10 ins., bearing a



Fig. 7.

COUCH GRASS.

(*Agropyron repens*.)

(About  $\frac{1}{2}$  nat. size.)

superficial resemblance to those of Rye Grass, but with the spikelets arranged with their broad sides to the stalk, spikelets 1 in. long, very stiff. Rootstock creeping extensively. (Fig. 3.) Shows preference for heavy soils, but common everywhere in fields, gardens and hedgerows. P. 6—8.

**CONTROL MEASURES :** During cultivation, when the creeping stems are brought to the surface, they should be gathered into heaps by harrows or rakes, and burnt or deeply buried. Forking out is the usual method in gardens and is sometimes necessary on arable land. Every bit of stem will sprout into a new plant; and so the work requires to be thoroughly done. Green crops, such as Maize or Vetches, which choke the weed, are very useful in reducing it. If the land be laid down to grass, couch will be eradicated in two or three years.

**NOTES :** The Frit Fly and Gout Fly find alternative hosts on this and other grasses. The underground stems form nutritious food, relished by horses and cattle. The ashes also have good manurial value. Couch grass has been employed medicinally from ancient times.

**GRASS, Creeping Bent (*Agrostis stolonifera*).** Surface Twitch. Fiorin.

See White Bent Grass (*Agrostis alba*). The present plant is merely a variety (or sub-species) of that species, but differs in its much more creeping habit. Frequent on most soils. P. 7—9.

**CONTROL MEASURES :** As for Common Bent Grass.

**GRASS, Darnel (*Lolium temulentum*).**

Stems 1—2 ft., round, rough towards the summit. Leaves flat, upper sides rough, also edges. Flower-spike 4—9 ins. long, separate spikelets about  $\frac{1}{2}$  in., usually with long awns, flower-stalk rough. The whole plant bears a very close general resemblance to the common Rye Grass. It differs, however, in its usually long awns, its complete lack of creeping rootstocks, and its absolute dependence upon seed for propagation, the whole plant dying away after fruiting. The seeds are nearly as large as grains of wheat. A. 6—8.

**CONTROL MEASURES :** Where Darnel occurs it should be thoroughly exterminated by fallowing. Harrowing and surface cultivation will encourage the seeds to germinate,

when the seedlings can be ploughed in during the Spring. It must never be allowed to reach the flowering stage, and every effort should be made to prevent it growing up with corn crops. Grain known to contain Darnel must never be sown, and should not be ground into flour for bread.

NOTES: Known as a poisonous or injurious plant for many centuries. The poisonous properties are due to fungus, known as *Endoconidium temulentum*, which is sometimes found in the seed. The rest of the grass is quite harmless to animals; but the seed is always liable to be poisonous, though not usually fatal. Deaths of horses, cattle, sheep and pigs have been recorded, however, as well as serious effects on human beings.

**GRASS, False Oat** (*Arrhenatherum avenaceum*).

Stems 2—4 ft., upright, rather thin, free from hairs, knots sometimes downy. Leaves flat, rough above. Flower-clusters  $\frac{1}{2}$ —1 ft., spreading but little, and slightly drooping, spikelets barely  $\frac{1}{2}$  in. long, glossy. Rootstock creeping extensively, sometimes developing tubers at the nodes. (The tuberous variety is dealt with under Onion Couch Grass, by which name it is commonly known.) P. 6—8.

CONTROL MEASURES: Persistent hoeing whenever possible, and good surface cultivation, and dragging out the roots with harrows should keep this and most other grasses in control.

**GRASS, Field Brome** (*Bromus arvensis*).

Stem 1—3 ft., upright, smooth. Leaves about  $\frac{1}{4}$  in. across, flat, undersides hairy, edges rough. Flower-clusters 3—9 ins. long, and about 4 ins. diameter, branches rough, spikelets  $\frac{1}{2}$  in. long, lance-shaped, green, often tinged purple. Root creeping, fibrous. An alien plant of local occurrence, seldom causing serious trouble. A. 7—8.

CONTROL MEASURES: Spring and Autumn cultivation should destroy most of the seedlings; but seeds may remain in the soil in a dormant state for a number of

years. It is therefore important to prevent the grass reaching the seeding stage, and to avoid sowing grain or temporary grass containing these seeds as an impurity.

**GRASS, Onion Couch** (*Arrhenatherum avenaceum*, var. *bulbosum*).

This grass is the same species as the False Oat Grass already described, but is even more troublesome, where it occurs, by reason of its tuberous rootstocks, even small portions of which readily give rise to new plants. P. 6—8.

**CONTROL MEASURES:** Very difficult to eradicate owing to its bulbous roots, each "bulb" of which will produce a new plant if left in the ground. The only certain method is picking out by hand during cultivation. Frequent root crops, with persistent hoeing and hand picking of the bulbs are recommended. In garden cultivation the roots should be regularly forked out and burnt. In case of a very bad infestation, it may be advisable to skim off and burn the surface soil.

**GRASS, Rye Brome** (*Bromus secalinus*).

Stems 2—4 ft., erect, stiff, free from hairs. Leaves about  $\frac{1}{4}$  in. across, rough on upper surface. Flower-cluster 3—6 ins. long, spreading, slightly branched, spikelets  $\frac{1}{2}$  in. long, egg-shaped. Frequent in fields in southern Britain. A. 6—8.

**CONTROL MEASURES:** As Field Brome Grass.

**GRASS, Smooth Brome** (*Bromus racemosus*).

Stems 1—3 ft., erect. Leaves stiff, rather downy. Flower-clusters more or less upright, spreading, little branched, sometimes quite simple, spikelets egg-shaped to oblong, smooth, containing 5—10 small flowers. A common weed in fields and grassland. B. 6—7.

**CONTROL MEASURES:** As Field Brome Grass.

**GRASS, White Bent** (*Agrostis alba*). Running Twitch.

Fiorin Grass, Marsh Bent Grass.

Stems  $\frac{1}{2}$ —2 ft., usually prostrate below, rooting at the



nodes. Leaves flat, rough, sometimes smooth. Flower-clusters 2—8 ins., spreading, branches rough, spikelets small, yellowish green. Stems and roots juicy and sweet. Grows equally well in marshy or dry places, and varies much in appearance. More frequent in grassland. Thrives on all soils. P. 6—9.

CONTROL MEASURES : As for Creeping Bent Grass.

**GRASS, Wild Oat** (*Avena fatua*). Havers. Bearded Oat.

Stems erect, round, stout, 1—3 ft., only the nodes hairy. Leaves flat, narrow, rough. Flower-clusters erect, 6—9 ins., spreading, branches springing mainly in rings round the stalk, rough, spikelets hanging, 1 in. long, green, awns brown, long, twisted, hygroscopic. A common weed. A. 6--8.

CONTROL MEASURES : Liable to occur as an impurity in seed oats, and care should be taken not to introduce the weed in this way, or to use seed from a crop known to be infested. The seedlings may be destroyed by the Autumn and Spring tillage operations, and by the hoeing of the root crop.

NOTES : This and other grasses are alternate hosts for the Oat-Apple Aphis (*Siphocoryne avenae*).

**GROMWELL, Corn** (*Lithospermum arvense*). Field Gromwell.

Stem  $\frac{3}{4}$ —1 $\frac{1}{2}$  ft., erect, branched, strong, rough, more or less zig-zag. Leaves from root broader, with stalks, stem-leaves lance-shaped, narrow, stalkless, partly embracing stem, blunt. Flowers few, small, each with 5 segments, dull white, barely longer than sepals. Nutlets very hard, greyish, glossy, with wrinkles. A typical weed of chalk districts, though frequent elsewhere. A. 5—6.

CONTROL MEASURES : The usual Spring tillage operations and the hoeing of root crops, should keep this plant under control. Autumn sown crops should be avoided.

NOTES : The plant has no poisonous or medicinal pro-



perties, but a red colouring matter is obtainable from the roots.

**GROUNDSEL, Common** (*Senecio vulgaris*). Grunsell.

Stem  $\frac{1}{2}$ —1 ft. or more, usually branched from below. Leaves deeply cut into segments, with irregular teeth, partly embracing the stem. Flower-heads about  $\frac{1}{4}$  in. diameter, yellow, cylindrical, becoming conical, ray-florets absent. Fruiting-heads small, feathery. Abundant everywhere. A. 1—12.

**CONTROL MEASURES :** This plant is difficult to keep down owing to its habit of flowering all the year round. Continual hoeing and hand pulling should be practised in the garden, and every opportunity of cleaning agricultural land utilised to the full. Root crops and fallowing provide these opportunities. Spraying, as for Charlock, will kill Groundsel and many other weeds in cereals.

**NOTES :** Groundsel possesses diuretic properties and has been largely used in medicine in the past. Its only modern use is as a food for cage birds. An incentive to its destruction lies in the fact that it acts as a host for the fungus which causes Black Root Rot in peas, and also for the Cinerarea Leaf Rust and Senecio Disease.

**HAWKSBEARD, Dandelion-leaved** (*Crepis taraxacifolia*).

Beaked Hawksbeard.

Stem 1—2 ft., erect, angular, furrowed, rough, branched above, usually purple below. Leaves chiefly springing from root, deeply cut, lobes pointing backward, stem-leaves stalkless, embracing the stem, much cut and toothed. Flower-heads about 1 in. diameter, yellow, brown or purple beneath. Fruiting head feathery. Grows principally on chalk, rather local. B. 6—7.

**CONTROL MEASURES :** See below.

**HAWKSBEARD, Smooth** (*Crepis virens*).

Stems 1—3 ft., branched, furrowed, smooth. Leaves from below with backward-pointing lobes, upper leaves

lance-shaped, narrow, embracing the stem. Flower-heads  $\frac{1}{2}$  in. or more in diameter, bright yellow. Fruiting heads feathery, white. Whole plant very variable. A. 6—10.

CONTROL MEASURES : Prevention of seeding is the most important, and if this can be done by hoeing and Spring cultivation, these weeds should not be troublesome.

**HEMP-NETTLE, Common** (*Galeopsis Tetrahit*).

Stem  $\frac{1}{2}$ —2 ft., covered with sharp bristles, square, swollen below the joints. Leaves 1—4 ins. long, egg-shaped, notched, pointed, hairy above and below, stalked. Flowers two-lipped, about 1 in. long, in dense rings round the stem, yellow and purple, sometimes wholly or partly white. A common weed of fields and waste ground. A. 6—9.

CONTROL MEASURES : As Red Dead Nettle.

**HERB ROBERT** (*Geranium Robertianum*). Stinking Crane's-bill.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., brittle, branched, reddish. Leaves 1—3 inches across, very deeply cut, long-stalked, handsome. Flowers  $\frac{1}{2}$  in. diameter, bright rosy-red, streaked, each stalk with two flowers, petals 5. Fruit long, supposed to resemble beak of crane. Common in hedgerows, etc., but seldom troublesome. Whole plant with strong scent. A. 5—9.

CONTROL MEASURES : As Crane's-bills.

NOTES : Supposed to possess antiseptic and therapeutic properties, and is efficacious as an insecticide.

**HOGWEED, Common** (*Heracleum Sphondylium*). Cow Parsnip. Cow Mumble.

Stem 2—5 ft., stout, hollow, furrowed, branched towards the summit. Leaves large, often 2 ft. long, deeply cut, segments usually broad, lobed, notched. Flowers in large umbels, petals 5, outer varying much in shape and size, white or pinkish. Common everywhere, but shows preference for chalk. B. or P. 6—8.

CONTROL MEASURES : Chiefly troublesome on pasture

land, but may encroach on to arable land from the hedge banks. Frequent hoeing or spudding when sprouting in the Spring will weaken the plants, and the roots may be dug out if necessary, and should always be collected when turned up by the plough.

**HORSETAIL, Field** (*Equisetum arvense*). Cat's-tail. Joints. (Plate III.)

A flowerless plant closely allied to the Ferns. Barren stems 1—2 ft. high, erect or partly prostrate, leafless, with green branches arranged in rings round the stem, all jointed. Fertile stems brownish, erect, 6—8 ins. high, crowned by sporecone, leafless and without branches, appear in March and April, before the barren stems. Root-stock creeping extensively. Common on most soils, but prefers moist land. P.

**CONTROL MEASURES:** Presence invariably indicates underground water, and draining is the only really effective remedy. The roots descend from two to four feet, so deep draining is necessary. Regular cutting should also be practised, especially of the fruiting stems early in the Spring, and two root crops may be taken in succession with the object of reducing it. Good manuring is important, and the growth of heavy smother crops of Mustard, Vetches, Rye Grass or Maize are also useful as a final measure.

**NOTES:** For poisonous properties and occurrence on pasture land see Section II.

**KNAPWEED, Black** (*Centaurea nigra*). Hardheads. Horse Knobs. Ironheads.

Stems 1—3 ft., erect, furrowed, branched, rough. Leaves lyre-shaped below, lance-shaped above, rough, very variable. Flower-heads 1—1½ ins. diameter, purple, usually lacking the outer rays so conspicuous in the Greater Knapweed (below). A lover of chalk, but a common weed on most ground. P. 6—9.

**CONTROL MEASURES:** See below.

**KNAPWEED, Greater** (*Centaurea Scabiosa*). Matfellow. Hardheads.

Stem 2—3 ft., erect, furrowed, branched, usually stouter than in Black Knapweed (above). Leaves large, often 9 ins. long, deeply cut, segments mainly lance-shaped, pointed. Flower-heads up to 2 ins. diameter, with conspicuous outer ray-florets, bright reddish-purple, sometimes white. Grows indifferently in all parts, but more abundantly on chalk. P. 6—9.

**CONTROL MEASURES:** Chiefly pasture weeds; but on arable land may be reduced by liberal use of phosphate manures, combined with good cultivation and using the advantages offered by root crops and smother crops.

**KNAWEL, Annual** (*Schleranthus annuus*).

Stems 2—6 ins., branched, slender, spreading. Leaves  $\frac{1}{4}$ — $\frac{1}{2}$  in. long, opposite, very narrow, joined at base. Flowers minute, greenish, clustered, sepals remaining over fruits. Shows marked preference for light sandy soils. Seldom occurs on chalk. Usually A. 6—9.

**CONTROL MEASURES:** Good cultivation and the thorough hoeing of root crops should keep it in check. If troublesome it may be smothered by a catch crop of Mustard or Vetches.

**NOTES:** This plant has some nutritive value and is eaten by sheep.

**KNOTGRASS, Common** (*Polygonum aviculare*). Ironweed. Knotwort. Stoneweed. Hogweed. Knotweed. (Fig. 8.)

Stems  $\frac{1}{2}$ —3 ft., branched, seldom erect, usually of straggling habit, often quite prostrate. Leaves  $\frac{1}{2}$ —1 $\frac{1}{2}$  ins. long, alternate, often stalkless, narrow or lance-shaped. Flowers in clusters of 2—3 in axils of stems, barely  $\frac{1}{8}$  in. long, usually pinkish, sometimes red, green, or dull whitish. Abundant everywhere. A. 5—10.

**CONTROL MEASURES:** Most important to prevent seeding,

which can only be done by persistent hoeing whenever possible. Frequent crops that admit of hoeing should be taken. The seeds may be encouraged to germinate by Spring cultivation, when the seedlings can be largely destroyed by harrowing, horse-hoeing, etc.

NOTES: Eaten by pigs, hence its name "Hogweed." It also possesses astringent properties, and has been used medicinally.



Fig. 8.

COMMON KNOTGRASS.

(*Polygonum aviculare*.)

(About  $\frac{2}{3}$  nat. size.)

**LADY'S MANTLE**, Field (*Alchemilla arvensis*). Parsley  
Piert.

Stems 2—6 ins., upright or partly prostrate, branched, leafy, round. Leaves about  $\frac{1}{2}$  in. long, alternate, flat, 3-lobed, notched, shortly stalked. Flowers very small,



clustered, green. Root fibrous. Common on all lands, but appears to dislike lime. A. 5—8.

**CONTROL MEASURES :** Hoeing and the growth of such crops as permit of hoeing. Prevention of seeding.

**NOTES :** Possesses astringent properties, and an infusion of the plant has been used medicinally.

**MADDER, Field** (*Sherardia arvensis*). Spurwort.

Stems  $\frac{1}{2}$ —1 ft., branched, spreading, more or less prostrate. Leaves oblong to lanceolate, about  $\frac{1}{2}$  in. long, arranged in rings of 4—6. Flowers lilac, not exceeding  $\frac{1}{8}$  in. diameter, in a small terminal stalkless umbel. Common everywhere. A. 4—10.

**CONTROL MEASURES :** As Lady's Mantle. Take care that the fruits are not present as impurities in the seed when sowing grasses and clovers.

**MARIGOLD, Corn** (*Chrysanthemum segetum*). Wild Marigold. Yellow Ox-eye.

Stem erect, 1—1 $\frac{1}{2}$  ft., angular, more or less branched. Leaves alternate, upper embracing the stem, oblong, lower stalked, deeply cut. Flower-heads about 2 ins. across, rich golden yellow, occurring at the summits of stout stalks. Prefers light ground, and seldom occurs where lime is plentiful. A. 6—9.

**CONTROL MEASURES :** A very injurious plant and difficult to destroy. Every effort must be made to prevent seeding. Two or three successive fallow crops, if well hoed, should have an effect; but any plants in flower must be burnt, or the seeds will ripen. The presence of this plant shows need of lime, and it may be greatly reduced by applying at least a ton of lime per acre for two or three seasons. In corn crops spraying with Copper Sulphate, 30 lbs. to 100 gallons of water, has very good results. The chaff and tailings from a threshing machine may contain large numbers of the fruits and flower-heads, and if so it should either be



burnt, or cooked and given to stock if the fruits are not very abundant.

NOTES : The seeds are poisonous when present in chaff in large quantities, and it is not safe to use such chaff even after cooking or steaming.

**MAYWEED, Rayless** (*Matricaria discoidea*). Rayless Chamomile. (Plate V.)

Stems  $\frac{1}{4}$ —1 ft., branched, erect, or spreading. Leaves alternate, very finely cut into narrow segments. Flower-heads yellowish, shortly stalked, consisting of disks only, the outer ring of florets being entirely absent. The whole plant has a sweet, apple-like scent when lightly bruised. An alien weed from North America, now firmly established in many parts of Britain. Often abundant about gateways and cart-tracks. A. 6—9.

CONTROL MEASURES : As Corn Chamomile.

**MAYWEED, Scentless** (*Matricaria inodora*). Chamomile. Dog Daisy. Corn Feverfew. Scentless Feverfew.

Stems erect, 1—1 $\frac{1}{2}$  ft., angular, smooth, branched. Leaves alternate, finely divided, stalkless. Flower-heads 2 ins. across, occurring singly on long stalks, central disk yellow, outer ray florets pure white. Whole plant free from hairs, and without scent even when bruised. An abundant weed, partially avoiding chalk. A. or B. 6—10.

CONTROL MEASURES : As Corn Chamomile. Spraying with Copper Sulphate, as for Charlock, largely destroys it in corn crops.

**MAYWEED, Stinking** (*Anthemis Cotula*). Stinking Chamomile.

Stem 1—2 ft., erect, branched, furrowed. Leaves finely cut into very narrow segments, smooth, dotted with minute glands. Flower-heads 1—1 $\frac{1}{2}$  ins., growing singly at summits of long stalks, central disk pale yellow, outer florets white. Whole plant smelling strongly when bruised,

acid, sometimes blistering the skin. Frequent on clays and heavy ground. A. 6—9.

**CONTROL MEASURES :** As Corn Chamomile. Prevalent on poor land out of condition from wet and bad cultivation, and deficient in lime. Apply one or two tons of lime and 4 to 6 cwt, of Superphosphate per acre.

**NOTES :** Seeds very poisonous and chaff containing them should be burnt. Often causes abscesses on the hands of men handling sheaves, as well as on the noses of sheep feeding on the stubble. The plant is suspected of poisonous properties, but its unpleasant smell and taste cause animals to avoid it.

**MEDICK, Black** (*Medicago lupulina*). Nonesuch. Trefoil.

Stems  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., branched, spreading, often more or less prostrate. Leaves made up of 3 leaflets, as in Clover, each leaflet about  $\frac{1}{2}$  in. long, inversely egg-shaped, notched, very shortly stalked. Flowers yellow, minute, clustered into egg-shaped heads, resembling those of the common Yellow Trefoil. Seed-pods very small, black, clustered. Common everywhere. A. or B. 5—8.

**CONTROL MEASURES :** Good surface cultivation and hoeing out the plant to prevent seeding.

**NOTES :** This plant is only a weed on arable land, being cultivated in grass and clover mixtures.

**MERCURY, Annual** (*Mercurialis annua*).

Stems  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., erect, smooth, much branched, branches opposite. Leaves opposite, bright green, stalked, egg-shaped or narrower, smooth, with notched edges. Flowers in spikes, arising at junction of leaf-stalk and stem, green, minute. Not of general occurrence, but often troublesome locally. A. 6—9.

**CONTROL MEASURES :** Hoeing and general surface cultivation, to prevent seeding. The thorough cleaning of root crops.

NOTES : A poisonous plant, with similar properties to Dog's Mercury. It has caused poisoning of all kinds of farm animals and man. It is usually avoided by animals, however, but is harmless when dried in hay.

**MIGNONETTE, Wild** (*Reseda lutea*). Base Rocket. Yellow-weed.

Stem 1—2 ft., smooth, ribbed, branched. Leaves about 3-lobed, lower deeply cut into several segments, very variable. Flowers in terminal clusters, resembling those of the cultivated Mignonette, but scentless, yellowish. A typical weed of the chalk. Common locally. B. 6—8.

CONTROL MEASURES : Hoeing and good cultivation generally.

**MINT, Corn** (*Mentha arvensis*).

Stems  $\frac{1}{3}$ —1 ft., square, branched, spreading, often more or less prostrate. Leaves opposite, egg-shaped, stalked, notched. Flowers in ringed clusters at the junction of leaf-stalk with stem, pale purple. Whole plant very variable. Occurs indifferently on most soils, but shows preference for clays. P. 7—9.

CONTROL MEASURES : Draining is the surest method, combined with thorough deep cultivation. The underground stems and roots, turned up by the plough or cultivator, must be collected by harrows and burnt. Green crops greatly help by choking out the weed, and frequent well-hoed root crops should be taken. Soils where this plant grows are frequently sour, and liming will have a good effect.

NOTES : Several species of *Mentha* are used for medicinal and flavouring purposes, and this plant no doubt has similar properties. The Rust Fungus of cultivated Mint is also found on the wild species.

**MOUSETAIL, Common** (*Myosurus minimus*).

No true stems, but flower-stalks from 2—6 ins. high. Leaves all springing from the root, very narrow, and of

rather fleshy texture. Flowers in small spikes, minute, petals 5, greenish-yellow. Roots small, fibrous. A small weed of local occurrence, mainly on light soils. A. 4—6.

**CONTROL MEASURES:** Good surface cultivation in the Spring.

**MUGWORT** (*Artemisia vulgaris*). Mugweed. Wild Wormwood.

Stems 2—4 ft., upright, branched, smooth, furrowed. Leaves 2—3 ins. long, flat, deeply cut, smooth and dark green above, white with woolly growth below. Flower-heads small, in crowded clusters, each head egg-shaped, reddish in colour, turning to brown. An aromatic weed, closely resembling the Wormwood of gardens. Occurs mainly along hedgerows and cart-tracks. P. 7—9.

**CONTROL MEASURES:** Hoeing, spudding, and hand pulling; or frequent cutting when growing on waste land at margins of fields.

**NOTES:** Has a very aromatic smell, and is used medicinally as a diuretic, etc.

**MUSTARD, Black** (*Brassica nigra*). Charlock. Ketlock. Wild Mustard. Runch.

Resembles White Mustard and Charlock in general appearance, but very distinct when in fruit. The seed-pods are awl-shaped and quite short, often less than  $\frac{1}{2}$  in., sometimes scarcely  $\frac{1}{4}$  in., and instead of spreading outwards as in the other species, they are practically erect beside the stem. Very local. A. 6—9.

**CONTROL MEASURES:** As Charlock.

**NOTES:** This is cultivated for seed, from which the ordinary ground mustard is obtained. May become a troublesome weed in localities where previously cultivated, as the seeds can remain dormant in the soil for a great number of years. The ground seeds are used medicinally as an irritant poultice and as an emetic. The volatile

mustard oil, obtainable from the seeds, is a very powerful irritant. Like Charlock, the seeds are poisonous to stock.

**MUSTARD, Garlic** (*Sisymbrium Alliaria*). Jack-by-the Hedge. Sauce-alone.

Stems 2—3 ft., erect, or somewhat prostrate at the base, very little branched, or not at all, usually free from hairs. Leaves 1—3 ins. diameter, stalked, more or less heart-shaped, with broad teeth. Flowers  $\frac{1}{4}$  in. diameter, numerous, petals 4, white. Pods 2—3 ins., slender, curved. Whole plant smells like garlic when bruised. Common along hedgerows, etc. A. or B. 5—6.

**CONTROL MEASURES:** Cutting down along hedge banks and the margins of fields and hoeing out should it encroach on to the arable land.

**NOTES:** Acts as a food plant for the larvae of the Diamond Back Moth. (Plate IV.) Possesses poisonous properties, similar to Charlock, due to the oil contained in the seeds.

**MUSTARD, Hedge** (*Sisymbrium officinale*).

Stems 1—2 ft., erect, more or less hairy, with horizontal branches. Leaves with backward-pointing lobes, often deeply cut, hairy. Flowers barely  $\frac{1}{8}$  in. diameter, petals 4, pale yellow. Pods short, slightly angled, seldom exceeding  $\frac{1}{2}$  in. (Plate III.) Common by hedgerows and trackways. A. 6—7.

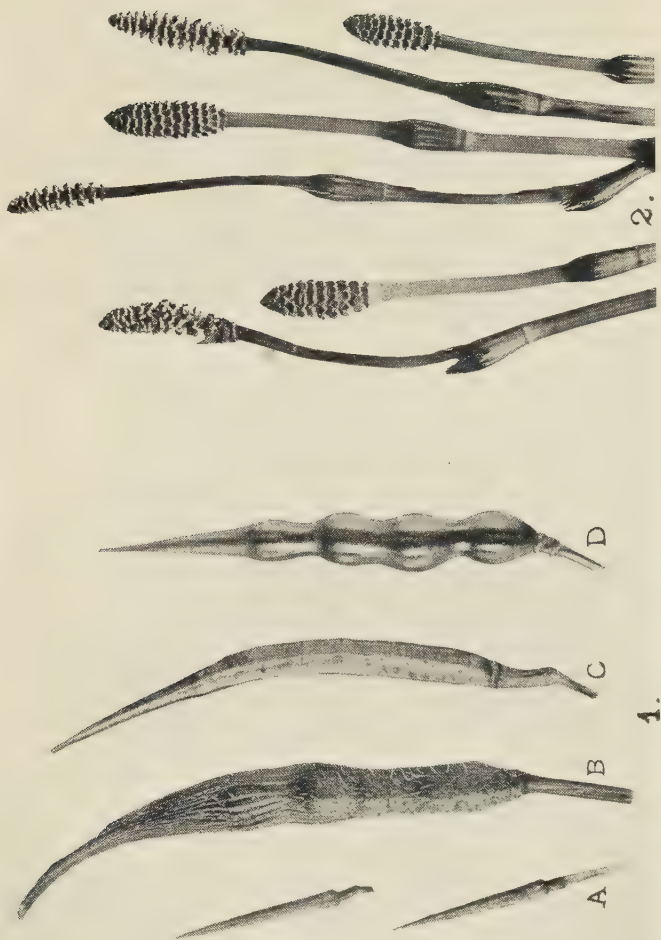
**CONTROL MEASURES:** As previous species.

**NOTES:** Acts as a host plant for several insect pests which attack turnips and cabbages, viz., the Turnip Beetle, Turnip Gall Weevil, Cabbage Root Fly and the Diamond Back Moth.

**MUSTARD, White** (*Brassica alba*). Charlock. Ketlock. (Fig. 9.)

Stems 1—3 ft., upright, branched, furrowed, rough with stiff hairs. Leaves mostly lyre-shaped, deeply cut or lobed. Flowers  $\frac{1}{2}$  in. diameter, petals 4, bright yellow.





### PLATE III.

1. Enlarged fruits of (A) Hedge Mustard, (B) White Mustard, (C) Charlock, (D) Wild Radish.
2. Fruiting spikes of Field Horsetail.





Pods cylindrical, knotted, bristly, with a longer sword-shaped beak. (Plate III.) An abundant weed in chalky districts. Closely resembling the true Charlock. A. 6—7.

**CONTROL MEASURES :** Unlike the Black Mustard and Charlock, the seeds all germinate at the same time and the seedlings are then easily destroyed by surface cultivation.

**NOTES :** A useful plant, largely grown as a catch-crop, or smother crop, being either fed off by sheep or ploughed



Fig. 9.

**WHITE MUSTARD**

(*Brassica alba*.)

(About  $\frac{1}{2}$  nat. size.)

in as green manure. It is sometimes also grown for seed for the preparation of ground mustard, and an oil, similar to Rape oil, is obtainable from the seeds. Used medicinally, for similar purposes to, but to a lesser extent than, Black Mustard.

**NETTLE, Common** (*Urtica dioica*). Stinging Nettle.

Stems stout, 2—4 ft., with or without branches. Leaves 2—4 ins., opposite, more or less egg-shaped, with heart-shaped bases, deeply notched. Flowers very small, green,

in catkin-like clusters 1—3 ins. long. Whole plant covered with stinging hairs. Common everywhere. P. 6—9.

**CONTROL MEASURES :** Digging up the creeping rhizomes and burning them is the most effective method, and can be practised on a small scale. Frequent cutting, when a few inches high, weakens the plants and eventually kills them. Nettles may be destroyed by dusting with *finely ground Kainit*. This should be applied to the young shoots in the Spring, when the leaves are wet with dew, but not during wet weather. Hot sunshine following the application is advantageous, and the early morning is thus the best time for the operation. If further shoots appear, they must be again treated.

**NOTES :** The stinging properties of nettles are well known, but they are not poisonous and when dead are readily eaten by farm animals. They have often been dried and used as fodder, and are even grown for the purpose in some European countries. Fibre for weaving is obtained from nettles on the Continent. They are also boiled and used for human food, as well as medicinally and for herb beer.

### **NETTLE, Small (*Urtica urens*).**

Closely resembling the Common Nettle (above), but usually much smaller in size, often not exceeding 6 ins. The leaves are bright green, and every hair on the plant is venomous. A common arable weed. Prefers light ground where little lime is present. A. 6—9.

**CONTROL MEASURES :** Prevention of seeding by hoeing and the usual tillage operations will keep this weed in check; or, along with many other weeds, it may be destroyed by dusting with finely ground Kainit. (See previous species.)

### **NIGHTSHADE, Black (*Solanum nigrum*).** Garden Nightshade.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., angular, usually much branched. Leaves 1—3 ins., roughly egg-shaped, angular, toothed. Flowers about  $\frac{1}{2}$  in. diameter, white, clusters drooping.

Berries globular,  $\frac{1}{8}$  in. diameter, mostly black, rarely red or yellow. Common in gardens and allotments. A. 6—10.

**CONTROL MEASURES:** Chiefly a garden weed, where it may be exterminated by persistent hoeing. On farm land, the cleaning of fallow crops should keep it in check sufficiently.



Fig. 10.

**COMMON NIPPLEWORT.**

(*Lapsana communis*.)

(About  $\frac{1}{2}$  nat. size.)

**NOTES:** A poisonous plant, containing Solanine, the same poison which is present in the potato plant. Fatal cases of poisoning of both man and animals are recorded, but the toxicity of the plant evidently varies greatly, for it has frequently been eaten with impunity.

**NIPPLEWORT, Common** (*Lapsana communis*). (Fig. 10.)

Stems 1—2 $\frac{1}{2}$  ft., erect, branched. Leaves egg-shaped to

lyre-shaped, alternate, usually angular or toothed, stalked, end lobe large. Flower-heads numerous,  $\frac{1}{4}$  in. diameter, yellow, generally closing in the afternoon. Common everywhere, but especially on heavy ground, often in the stunted form shown in Plate VI. A. 6—9.

**CONTROL MEASURES :** Prevention of seeding, and destruction of young plants by hoeing and the usual tillage operations will keep this weed in check. Use seeds free from the fruits of this plant.

**ORACHE, Halberd-leaved** (*Atriplex hastata*). Wild Orache. Fat Hen.

Closely resembling Spreading Orache (below), and often considered merely a sub-species of that plant. It is, however, mainly erect, and the lower leaves are broadly triangular, with lobes widely spreading. It is also an annual plant, is equally common, and flowers for the same period.

**CONTROL MEASURES :** As Goosefoot.

**ORACHE, Spreading** (*Atriplex patula*). Wild Orache. Fat Hen.

Stems spreading,  $\frac{1}{2}$ —3 ft. long, sometimes prostrate, occasionally erect. Leaves with triangular outline, rather narrow, lower ones in opposite pairs. Flowers very small, without petals, green, in dense clusters. Whole plant more or less covered with a powdery meal, often tinged with red. A common weed on clays and heavy ground. A. 6—10.

**CONTROL MEASURES :** As Goosefoot.

**PANSY, Field** (*Viola tricolor*). Heartsease. Garden Gates.

Stems upright or spreading, from  $\frac{1}{4}$ —1 $\frac{1}{2}$  ft. long, angled. Leaves lyre-shaped, about 1 in. in length, toothed. Flowers resembling those of garden Pansy, about  $\frac{1}{2}$  in. diameter, petals yellow, purple or variegated. Shows preference for chalk, but common on most soils. A. 5—10.



**CONTROL MEASURES :** Cultivation and harrowing will destroy the seedlings, and well cleaned root crops will keep the weed in check.

**NOTES :** Occasionally used medicinally in mixtures for blood disorders.

**PARSLEY, Corn** (*Carum segetum*).

Stems  $1\frac{1}{2}$ —3 ft., upright, branched. Leaves parsley-like, finely cut, 3—6 ins. long. Flowers very small, white, in irregular, drooping umbels. A common weed locally. A. 8—9.

**CONTROL MEASURES :** Surface cultivation and the thorough cleaning of root crops. The chief thing is to prevent seeding.

**PARSLEY, Fool's** (*Æthusa Cynapium*). False Parsley.  
(Plate 1.)

Stems 1—2 ft., upright, branched, marked with parallel lines. Leaves 4—6 ins., with triangular outline, very deeply cut into fine segments, and borne on slender stalks. Flowers small, in spreading umbels, petals 5, white. Whole plant with fetid odour, poisonous. Common in most fields and gardens, often in stunted form shown in Plate I. A. 7—9.

**CONTROL MEASURES :** As previous species, but more difficult to eradicate. Two fallow crops in succession, or bare fallowing is sometimes necessary.

**NOTES :** Poisonous to man and animals, the toxic principle probably being the alkaloid Coniine. May cause diarrhoea, fever, partial paralysis and death, but has sometimes been eaten without ill effects.

**PARSLEY, Knotted Bur** (*Caucalis nodosa*). Knotted Hedge Parsley.

Stem  $\frac{1}{2}$  to  $1\frac{1}{2}$  ft., upright or prostrate, rather slender. Leaves rather small, deeply cut into narrow segments. Flowers minute, white or pinkish, arranged in almost globular umbels opposite to leaves. Fruits in dense

roundish clusters, covered with hooked spines. Common locally. A. 5—7.

CONTROL MEASURES : As following species.

**PARSLEY, Spreading Hedge** (*Caucalis arvensis*). Spreading Bur-Parsley.

Stems seldom exceeding 6 ins. high, very much branched, angular, clothed with many leaves. Leaves deeply cut into narrow segments, notched. Flowers minute, white or pinkish, in many small dense umbels. Fruits rough with hairs. Abundantly locally. A. 7—9.

CONTROL MEASURES : Both these species of *Caucalis* should be regularly cut down along the margins of fields, thus preventing seeding. May be hand pulled or destroyed with the hoe, should they occur amongst a crop.

NOTES : Said to be poisonous and to have killed cattle and pigs, but little is known concerning it.

**PEARLWORT, Common** (*Sagina procumbens*).

Stems spreading, mainly prostrate, 3—9 ins. long. Leaves very narrow, smooth, free from hairs, growing in opposite pairs. Flowers drooping, petals usually 4, very tiny, white. A common weed of paths and dry places. P. 5—9.

CONTROL MEASURES : This little plant is unlikely to be troublesome on arable land and the usual tillage operations should keep it in check.

**PENNY-CRESS, Common** (*Thlaspi arvense*). Wild Cress.

Stems 1—2 ft., erect, with few or no branches, smooth. Leaves stalked below, stalkless above, more or less oblong, toothed. Flowers  $\frac{1}{4}$  in. diameter, petals 4, white, inversely egg-shaped. Pods very conspicuous, often  $\frac{3}{4}$  in. diameter, flat, circular, with a deep notch, seeds tasting of garlic. A common weed locally. A. 5—7.

CONTROL MEASURES : Prevent seeding by destroying the plants when young, with the harrow, cultivator and hoe.

Root crops offer good facilities for cleaning the land, or if badly infested a bare fallow may be necessary. In the latter case care should be taken to plough in the weeds before their seeds are formed. Laying the land down to temporary pasture for several years will choke out the weed.

NOTES: Not poisonous, but has a very objectionable smell and taste; if eaten by cows it strongly taints the milk and its products, and the meat from animals that have eaten the weed is likewise tainted.

**PEPPERWORT, Field** (*Lepidium campestre*).

Stems  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., upright, usually with branches. Lower leaves inversely egg-shaped, often deeply cut, upper ones roughly arrow-shaped, notched. Flowers minute, seldom reaching  $\frac{1}{8}$  in. diameter, white. Pods in loose spreading clusters, oval,  $\frac{1}{4}$  in. long. Common locally, but seldom troublesome. A. or B. 6—8.

CONTROL MEASURES: As previous species. Spraying as for the following species, might be advisable if the weed is troublesome.

**PEPPERWORT, Hoary** (*Lepidium Draba*). Thanet Weed.

Whitlow Peppermint. Devil's Cabbage. Chalkweed.

White Weed. (Frontispiece.)

Stems 1—3 ft., often much branched near the summit, more or less hoary or downy. Leaves 1—3 ins. or more, lance-shaped or oblong, toothed, lower ones with stalks, upper stalkless, embracing the stem, often whitish with down. Flowers numerous, about  $\frac{1}{4}$  in. diameter, petals 4, white. Pods  $\frac{1}{8}$  in. diameter, roughly heart-shaped, on slender stalks. Root very long, and difficult to eradicate. An alien weed, already very troublesome in several eastern counties. P. 5—6.

CONTROL MEASURES: Small patches should be dug out, taking care to completely extract the extensive creeping underground stems. In cereal crops, spraying has given good results, but slightly stronger solutions are used than

for Charlock. Copper Sulphate, 50 lbs. in 100 gallons of water; Ammonium Sulphate,  $3\frac{1}{4}$  cwt. in 100 gallons; and a mixture of 20 lbs. of Copper Sulphate and 80 lbs. of Ammonium Sulphate in 100 gallons, have all been found effective and do not permanently injure the crop, though temporary scorching takes place. Spraying is best done when the weed is in flower and in dry weather. The Sulphate of Ammonia spray acts quickest, and also stimulates the growth of the crop.

The weed should be attacked with the hoe whenever possible, and spraying will doubtless be necessary for several years until the roots are exhausted.

**PERSICARIA, Spotted** (*Polygonum Persicaria*). Willow-weed.

Stems branched,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., usually more or less prostrate at the base, branches erect or spreading. Leaves with little or no stalk, egg-shaped or lance-shaped, pointed, often bearing a blackish mark in the centre. Flowers reddish or whitish, very small, in dense clusters about 1 in. in length. Common everywhere, but not so troublesome on chalk. A. 7—10.

**CONTROL MEASURES:** Prevent seeding by persistent hoeing whenever possible. Fallow crops that admit of hoeing should be taken frequently where the weed is plentiful, and the seedlings destroyed in Spring by cultivating, harrowing, horse-hoeing, etc. Copper Sulphate solution, 40 lbs. in 100 gallons, will destroy this weed.

**NOTES:** Suspected of poisonous properties, and stated to produce a rash on both man and animals. It has often been used as food for cattle and horses, which readily eat it, but is said to have caused the death of sheep and pigs.

**PIMPERNEL, Scarlet** (*Anagallis arvensis*). Poor Man's Weather Glass. Red Bird's-eye.

Stems much branched from below, more or less square in shape, branches  $\frac{1}{2}$ —1 ft. long. Leaves usually egg-shaped, stalkless, in opposite pairs, dotted with minute glands.

Flowers  $\frac{1}{4}$ — $\frac{1}{2}$  in. diameter, with 5 divisions, bright brickish red, closing in dull weather. A lover of chalky soils, but common everywhere. A. 5—10.

**CONTROL MEASURES :** Easily kept in check by the usual methods of cultivation.

**NOTES :** Contains a narcotic poison acting as an irritant on the digestive organs, and deaths of animals have been caused by it, although it is distasteful to them and usually avoided. It has been used medicinally for rheumatic affections, etc.

**PLANTAIN, Greater** (*Plantago major*). Waybread.  
Rat's-tail. (Fig. 25.)

True stems absent. Leaves 2—6 ins. long, roughly egg-shaped, stalked, with 7 or less prominent ribs. Flower-stalk 3—6 ins. long, surmounted by spike of flowers often much longer than the stalk itself, the whole often reaching 1—1 $\frac{1}{2}$  ft. in length. Flowers minute, greenish, with purple anthers. Occurs everywhere, but is specially troublesome on heavy ground. P. 5—9.

**CONTROL MEASURES :** As Ribwort Plantain.

**PLANTAIN, Hoary** (*Plantago media*). Lamb's-tongue.

Resembles Greater Plantain in general structure, but has longer flower-stalks and much shorter flower-spikes, the latter usually being only 1—3 ins. in length. The leaves are hoary, and are smaller than in the above species, and the flower-spikes are purplish and ornamental. A frequent pest of heavy soils. P. 6—10.

**CONTROL MEASURES :** As following species.

**PLANTAIN, Ribwort** (*Plantago lanceolata*). Cocks-and Hens. Hardheads.

Resembling above species in habit, but with lance-shaped leaves, often toothed, and short dark brown or black flower-spikes on stalks up to a foot or more in height. Occurs indifferently in all districts. P. 5—10.



**CONTROL MEASURES :** May be kept down by good cultivation, well cleaned root crops, and the use of pure seed.

**NOTES :** The Greater Plantain is used medicinally as an alterative and diuretic, and the seed as a food for cage birds. Ribwort Plantain has been used as food for sheep on poor land. Plantains are chiefly pasture weeds (see Section II.) and are very troublesome on lawns (see Section III.).

Ribwort Plantain is an alternate food plant for *Aphis malifoliæ*, which attacks the apple.

**POPPY, Corn** (*Papaver Rhœas*). Corn Rose. Head-aches. Wild Poppy.

Stem 1—2 ft., branched, rough with spreading hairs. Leaves deeply lobed and cut. Flowers about 3 ins. diameter, petals 4, scarlet, on long stalks with outstanding bristles. Capsules globular, smooth, containing abundant seeds. Common everywhere, but prefers light ground. A. 6—9.

**CONTROL MEASURES :** Good manuring to produce heavy crops, which will tend to choke out the weeds. Frequent well cleaned fallow crops, and good surface cultivation in the Spring. Deep ploughing should be avoided, as it will bring buried seeds to the surface. In corn crops seeding may be prevented by spraying either with Copper Sulphate, or Iron Sulphate. Copper Sulphate 12 lbs. in 40 gallons, or Iron Sulphate 60 lbs. in 40 gallons, per acre.

**NOTES :** Poppies contain the alkaloid Morphine and are highly poisonous to all farm animals, but are rarely eaten voluntarily owing to their smell.

The Red Poppy is used medicinally, a syrup made from the petals being official in the British Pharmacopœia, 1914.

The seeds are sold for cage birds under the name of "Maw Seed," and a red dye is obtainable from the petals.

**POPPY, Long-headed** (*Papaver dubium*). Corn Rose. Headaches. Wild Poppy.

Closely resembles Corn Poppy (above), but the hairs are pressed tightly against the flower-stalks, the petals are



light scarlet, the opposite pairs being unequal, and the smooth capsules are oblong instead of globular. Quite common. A. 5—8.

CONTROL MEASURES : As previous species.

**POPPY, Rough-headed** (*Papaver Argemone*). Corn Rose. Headaches. Wild Poppy. Pale Poppy.

Resembles the above species in general appearance, but usually much smaller. The petals are pale scarlet, marked with a blackish blotch at the base, and the club-shaped capsule is covered with stiff bristles. A frequent weed except in chalky fields. A. 5—7.

CONTROL MEASURES : As Corn Poppy.

**RADISH, Wild** (*Raphanus Raḫhanistrum*). White Charlock. Charlock. Runch. Jointed Charlock.

Stem 1—2 ft., usually upright, branched, hairy or bristly. Leaves 3—9 ins. long, upper often narrow, lower lyre-shaped, with coarse teeth. Flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. across, petals 4, white, veined, often pale yellow or lilac. Pods 1—2 ins. long, beaked, more or less jointed between the seeds. (Plate III.) Common everywhere. A. 5—9.

CONTROL MEASURES : As for Charlock. Spraying must be done early.

NOTES : The seeds have similar properties to those of Charlock, and are dangerous to animals.

**REST-HARROW, Common** (*Ononis repens*). Wild Liquorice. Cat's-whin. Cammock.

Stems shrubby, 1—1 $\frac{1}{2}$  ft. high, much branched, more or less hairy, usually slightly viscid. Leaves mainly of 3 leaflets, each inversely egg-shaped, upper of one leaflet only, edges notched. Flowers usually occurring singly, pea-shaped,  $\frac{1}{2}$ — $\frac{3}{4}$  in. long, pink, standard streaked red. Pod  $\frac{1}{4}$ — $\frac{1}{2}$  in. long, 2—3 seeded. Occurs mainly in pastures, common. P. 6—9.

CONTROL MEASURES : See below.

**REST-HARROW, Spiny** (*Ononis spinosa*). Wild Liquorice. Cat's-whin. Cammock.

Closely resembling Common Rest-Harrow (above), but usually more erect, less hairy, without runners, and bearing numerous sharp spines. Frequent in dry places. P. 6—9.

**CONTROL MEASURES:** Manuring to improve the quality of the soil, combined with good cultivation will eventually reduce Rest-Harrow. Heavy crops of Vetches or Lucerne greatly assist in choking it out.

**NOTES:** The fungus causing Clover Stem Rot attacks Rest-Harrow.

**SANDWORT, Thyme-leaved** (*Arenaria serpyllifolia*). Chickweed.

Stems 3—6 ins., slender, much branched, with fine hairs. Leaves  $\frac{1}{4}$  in. long, egg-shaped, very shortly stalked, pointed growing in opposite pairs. Flowers occurring singly, barely  $\frac{1}{8}$  in. diameter, petals 5, white. Prefers light and well-drained soils. A. 6—9.

**CONTROL MEASURES:** Unlikely to be harmful and may be kept in check by the ordinary methods of cultivation.

**SCABIOUS, Field** (*Scabiosa arvensis*). Pincushion.

Stem 1—4 ft., stout, branched towards summit, covered with hairs. Leaves very variable, lower stalked and mainly lance-shaped, upper stalkless, toothed or lobed, with broad bases. Flower-heads 1—1 $\frac{1}{2}$  ins. diameter, consisting of numerous lilac-purple florets, all 4-lobed. Shows preference for chalk, but common everywhere. P. 6—9.

**CONTROL MEASURES:** May be reduced by the use of phosphatic manures, combined with good cultivation. Deep ploughing to bury the roots, and surface cultivation to kill the seedlings.

**NOTES:** One of the numerous hosts of the Lettuce Mildew fungus. Chiefly a pasture weed.

**SELF-HEAL, Common** (*Prunella vulgaris*). All-heal.  
Wild Prunella.

Stems square,  $\frac{1}{4}$ —1 ft., upright or spreading, branched, hairy. Leaves in opposite pairs, 1—2 ins. long, lower stalked, upper stalkless, egg-shaped to oblong, usually toothed, often deeply so. Flowers in whorls forming dense spikes 1—3 ins. long, corolla two-lipped,  $\frac{1}{2}$ — $\frac{3}{4}$  ins. long, purple or reddish. A common weed everywhere. P. 7—9.

**CONTROL MEASURES:** The fruits are often introduced with Clover seed. On poor land the weed may be reduced by applications of phosphatic manures and lime, when occurring in leys and temporary pastures. When the leys are ploughed up it will not be troublesome.

**NOTES:** Has been largely used in medicine, and has astringent properties.

**SHEPHERD'S NEEDLE** (*Scandix Pecten-Veneris*).  
Venus' Comb. Needle Chervil.

Stem branched,  $\frac{1}{2}$ —1 ft. or more, furrowed, hairy. Leaves very finely cut into thin segments. Flowers tiny, in small umbels, very irregular in shape, white. Fruits 3 ins. or more in length, rough, slender, needle-like, very conspicuous. Abundant everywhere. A. 5—9.

**CONTROL MEASURES:** Spring cultivation to destroy the seedlings, and prevention of seeding by hoeing and hand pulling. The growth of two successive hoed crops, sown late in the season, is advantageous.

**SHEPHERD'S PURSE** (*Capsella Bursa-pastoris*). (Plate I.)

Stem branched,  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., smooth or hairy. Lowest leaves usually forming rosette, and deeply cut, upper with arrow-shaped bases, stalkless, and clasping the stem. Flowers very tiny, petals 4, white. Pods flat, inversely heart-shaped,  $\frac{1}{4}$  in. diameter, opening when ripe. Abundant everywhere. A. 3—12.

**CONTROL MEASURES:** Prevention of seeding most important. Spring cultivation and harrowing will destroy many

seedlings, and the continuous use of the hoe in root crops. If necessary, bare fallowing and smother crops may be resorted to.

NOTES : If eaten in quantity by animals, it may cause injury by forming fibrous balls in the stomach.

Encourages several pests, viz., the Turnip Beetle, Cabbage Root Fly, Stem Eelworm, Cabbage White Rust (Plate I.), and Club Root.

**SILVERWEED, Common** (*Potentilla anserina*). Goose-grass. Wild Tansy.

Leaves mainly in rosettes, 3—6 ins. long, pinnate, leaflets  $\frac{1}{2}$ — $1\frac{1}{2}$  ins., numerous, with deeply notched edges, the whole more or less silvery with glossy white hairs. The only stems are the trailing runners, which root at intervals, forming new plants. Flowers  $\frac{1}{2}$ — $\frac{3}{4}$  in. across, petals 5, bright yellow. Equally common on all lands. P. 6—8.

CONTROL MEASURES : As for Creeping Cinquefoil.

NOTES : Has been employed medicinally, possessing astringent properties. May be dangerous to stock, if eaten in quantity. Wood-pigeons and pheasants are said to feed on the roots.

**SORREL, Common** (*Rumex Acetosa*). Sour Dock.

Stem unbranched, 1—2 ft., erect, hollow. Lower leaves 3—5 ins. long, arrow-shaped, long-stalked, upper stalkless, clasping stem. Flowers tiny, in erect green to red clusters, resembling those of Docks, male and female occurring on separate plants. Leaves highly acid. Mainly in grass-land. Abundant. P. 5—8.

CONTROL MEASURES : Removal of the roots during cultivation, combined with hoeing and hand pulling to prevent seeding. A heavy dressing of Lime has a good effect. The use of pure seed is most important.

NOTES : Largely used as salad and for sauce-making in the past; also medicinally.

See " Docks " for Pests encouraged; also for the " Seeds Act " regulations.

**SORREL, Sheep's** (*Rumex Acetosella*). Sour Dock.

Closely resembling Common Sorrel (above), but usually less than 1 ft. high, often only a few inches. Leaves much smaller, often with spreading lobes at base. Whole plant often reddish, very acid, but much less succulent than above species. A hater of lime, but a troublesome weed on light and sandy ground. P. 5—8.



Fig. 11.

**COMMON SOWTHISTLE.**

(*Sonchus oleraceus*.)

(About  $\frac{1}{2}$  nat. size.)

**CONTROL MEASURES :** As previous species.

For Notes see Section II.

**SOWTHISTLE, Common** (*Sonchus oleraceus*). Milk Thistle. Milkweed. (Fig. 11.)

Stem usually branched, 2—3 ft., erect, round, glossy, hollow, grooved. Leaves large, roughly lance-shaped,



often with deep backward-pointing lobes, with or without stalks, more or less prickly, but only softly so. Flower-heads 1 in. diameter, consisting of many pale yellow florets. Fruiting heads feathery, thistle-like. Whole plant abounds in milky juice. Abundant everywhere. A. 6—9.

CONTROL MEASURES: The ordinary methods of cultivation and hoeing of root crops is usually sufficient.



Fig. 12.

**CORN SOWTHISTLE.**

(*Sonchus arvensis*.)

(About  $\frac{1}{2}$  nat. size.)

NOTES: Frequently used as food for rabbits. Host plant for the Currant and Lettuce Aphis (*Rhopalosiphum lactucae*).

**SOWTHISTLE, Corn** (*Sonchus arvensis*). Milk Thistle. Milkweed. (Fig. 12.)

Closely related to Common Sowthistle (above). Stem



2—4 ft., hollow, often branched, with black hairs above. Leaves lobed and toothed, not spinous. Flower-heads 2 ins. diameter, bright yellow. This plant has creeping rootstocks, and spreads rapidly from year to year. A frequent pest of heavy ground. P. 7—9.

CONTROL MEASURES : Hoeing the plants as fast as they appear, to prevent seeding and exhaust the underground stems. Two fallow crops, as mangolds and potatoes, may be taken in succession; the preliminary cultivation and subsequent hoeing largely reducing the weed. A Lucerne crop is a valuable assistance, and a Grass and Clover ley will kill out the weed. Spraying with Copper Sulphate (as for Charlock) will prevent seeding.

**SPEEDWELL, Field** (*Veronica agrestis*). Bird's-eye. Chickweed. Speedwell.

Stems prostrate, branched at the base, spreading, 3—9 ins., hairy. Leaves stalked,  $\frac{1}{2}$  in. long, egg-shaped, with notched edges, lower in opposite pairs. Flowers occurring singly, corolla 4-lobed,  $\frac{1}{4}$  in. diameter, pale blue or whitish. Common everywhere. A. 4—9.

CONTROL MEASURES : See below.

**SPEEDWELL, Ivy-leaved** (*Veronica hederifolia*). Bird's-eye.

Differing from Field Speedwell (above) mainly in its larger size, stouter growth, and 5—7-lobbed ivy-like leaves. Appears to dislike chalk, but occurs commonly in all parts.

A. 3—12.

CONTROL MEASURES : See below.

**SPEEDWELL, Large Field** (*Veronica Tournefortii*).

Birds'-eye. Cat's-eye. Buxbaum's Speedwell.

Differing from Field Speedwell (above) mainly in its larger size and more abundant hairs, and especially in its large bright blue flowers, usually  $\frac{1}{2}$  in. in diameter. Local. Shows preference for moist soils. A. 4—10.

CONTROL MEASURES : See below.

**SPEEDWELL**, Thyme-leaved (*Veronica serpyllifolia*).  
Bird's-eye.

Differing from Field Speedwell (above) mainly in its more erect habit, its faintly-notched leaves, and the fact that its flowers occur in terminal clusters, instead of singly, and are very pale lilac in colour, with blue lines. It is also a perennial. A common weed on light soils, and often abundant on chalk. P. 5—6.

CONTROL MEASURES : See below.

**SPEEDWELL**, Wall (*Veronica arvensis*). Bird's-eye.  
Corn Speedwell.

Differing from Field Speedwell (above) mainly in its erect habit, its heart-shaped lower leaves and lance-shaped stalkless upper ones, and its tiny white-eyed pale blue flowers. Appears to be less troublesome on chalk, but grows commonly in all parts, especially on dry and sandy soils. A. 5—10.

CONTROL MEASURES : Use pure seed. Harrow cereals well early in the season and see that root crops are well cleaned. Spraying with a 30 per cent. solution of Sulphate of Ammonia will kill Speedwells in corn crops.

**SPURGE**, Caper (*Euphorbia Lathyris*).

Stem stout, very erect, 3—4 ft., often purplish. Leaves opposite, 2—6 ins. long, in 4 rows down the stem, narrow-oblong, stalkless, upper with heart-shaped bases clasping the stem. Flowers in umbels of 3—4 rays, yellowish-green. Fruit  $\frac{1}{4}$ — $\frac{1}{3}$  in. diameter, ejecting large seeds when ripe. Local. Frequent in gardens. B. 6—7.

CONTROL MEASURES : See below.

**SPURGE**, Dwarf (*Euphorbia cyparissia*). Milkweed. Wart Plant.

Stems much branched at the base,  $\frac{1}{2}$ —1 ft., mainly erect, sometimes partly prostrate. Leaves  $\frac{1}{2}$ —1 in., very narrow lance-shaped, alternate, with smooth edges. Flowers small, yellowish-green, occurring in small usually 3-rayed umbels.

Whole plant with abundant milky juice. A common weed on heavy soils. A. 7—10.

CONTROL MEASURES : See below.

**SPURGE, Petty** (*Euphorbia Peplus*). Milkweed. Wart Plant.

Differs from Dwarf Spurge (above) mainly in its broad inversely egg-shaped leaves, and the fewer branches (often none, seldom more than 3) to its stem. Common everywhere. A. 7—10.

CONTROL MEASURES : See below.

**SPURGE, Sun** (*Euphorbia Helioscopia*). Milkweed. Wart Plant.

Differs from Dwarf Spurge (above) mainly in its larger size (1—1½ ft.), its less-branched stems (sometimes even unbranched), its large (1—2 ins.) inversely heart-shaped leaves with notched edges, and its usually 5-rayed (instead of 3) umbels of flowers. Prefers light ground, but common in all parts. A. 6—10.

CONTROL MEASURES : Prevent seeding. The ordinary tillage operations are usually sufficient.

NOTES : These four Spurges are violently purgative and poisonous, and have occasionally produced fatal results in man and animals. They are usually avoided, however, owing to their acrid juice.

**SPURREY, Corn** (*Spergula arvensis*). Spurry.

Stem straggling, branched at the base, ½—1½ ft., with swollen joints. Leaves about 1 in. long, very narrow, growing in whorls round the stem. Flowers in loose clusters, corolla ¼ in. diameter or less, petals 5, white, stalks often reflexed. Capsule globular. A lover of dry sandy soils, seldom occurring when lime is present. Often abundant and troublesome. A. 6—9.

CONTROL MEASURES : Apply heavy dressings of lime, up to four tons per acre, after ploughing, and work in by

surface cultivation. Avoid cereals and grow open fallow crops, that admit of easy cleaning, for several seasons. Mustard, if fed off by sheep before the Spurrey seeds, is useful. Crops entirely overrun by the weed, may be fed off by sheep. Spraying with Copper Sulphate (40 or 50 lbs. per 100 gallons) will largely destroy it and prevent seeding.

NOTES : Sheep like this plant, and it is grown for fodder on the Continent.

**STORK'S-BILL, Hemlock** (*Erodium cicutarium*).

Stem branched, with swollen joints, usually prostrate, branches  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., more or less hairy and sticky. Leaves pinnate, leaflets stalkless, deeply cut into narrow segments. Flowers in loose umbels, about  $\frac{1}{2}$  in. diameter, petals 5, rose-pink. Fruits long, slender, resembling stork's bill. Common locally, mostly near the coast. A. or B. 6—9.

CONTROL MEASURES : Hoeing, harrowing and general surface cultivation. The thorough cleaning of root-crops, and the occasional growth of Mustard or Lucerne.

**TANSY, Common** (*Tanacetum vulgare*).

Stem erect, branched, 2—3 ft., angular. Leaves 3—4 ins. long, deeply cut into narrow segments, edges notched. Flower-heads  $\frac{1}{4}$ — $\frac{1}{3}$  in. diameter, in loose clusters, yellow. Whole plant bitter and aromatic. Common locally. P. 7—9.

CONTROL MEASURES : As previous species.

NOTES : A poisonous plant, stated to have produced fatal results on cattle, although they normally refuse to eat it. The Sunflower Rust also attacks this plant.

**THISTLE, Creeping** (*Cnicus arvensis*). Field Thistle. (Fig. 13.)

Stem erect, branched, angular, grooved, 2—4 ft. high. Leaves deeply cut, lower stalked, upper with blades joining stem, all very spinous. Flower-heads pale purple  $\frac{1}{2}$ —1



PLATE IV.

1. Garlic Mustard with leaves attacked by larvæ of the Diamond Back Moth.
2. Creeping Thistle invested with Bean Aphis. (Inset: Bean Aphis enlarged.)
3. Fruiting heads of Wild Carrot, with partial umbels and fruits detached.





in. diameter. Male and female flowers usually occurring on separate plants, in more or less distant colonies. Root-stock creeping extensively. Abundant everywhere. P. 7—9.

CONTROL MEASURES : Summer cultivation of fallows and the frequent hoeing of two successive root crops. The



Fig. 13.

CREeping THISTLE.

(*Cnicus arvensis*.)

(About  $\frac{2}{3}$  nat. size.)

shoots must be destroyed early, soon after they appear, and cut down several times before the end of July. Avoid sowing cereals on infested land. Dense growing fodder crops, such as Lucerne, Tares, Kale or Maize are useful to choke out the weed. Spraying has no permanent effect.

NOTES : This and other thistles are food plants for the Bean Aphis (Plate IV.), Mangold Fly, Celery Fly, and the

larvae of Swift Moths, and are hosts of the fungi causing Lettuce Mildew and Chrysanthemum Rust. This species is also attacked by a rust fungus (*Puccinia obtegens*), which weakens and stunts the plants, and prevents flowering. Massee suggests that "by infecting sound plants, . . . by lashing them with a diseased plant when damp, it should be possible to eradicate one of our worst weeds."

The Ministry of Agriculture has power to require the destruction of Creeping Thistle within a specified time and in a stated manner.

**THISTLE, Musk** (*Carduus nutans*). Nodding Thistle. Scottish Thistle. (Fig. 21.)

Stem erect, branched, 1—3 ft., grooved. Leaves 6—9 ins. long, wavy, very spinous, with their bases running down the stem. Flower-heads often 2 ins. across, occurring singly on long stalks, drooping, handsome, florets crimson, smelling of musk. A common weed on light soils, and a lover of chalk. B. 7—9.

CONTROL MEASURES : See below.

**THISTLE, Scotch** (*Onopordon Acanthium*). Cotton Thistle.

Stem stout, erect, branched, 3—5 ft. Leaves large, very spinous, with bases running down stem. Flower-heads 1—2 ins. diameter, much cobwebbed beneath, florets pale purple. Whole plant woolly or cottony. Local. B. 7—9.

CONTROL MEASURES : See below.

**THISTLE, Spear** (*Cnicus lanceolatus*).

Stem stout, erect, branched, spinous, 2—4 ft. Leaves 6—10 ins. long, deeply cut into stiff, thorny segments, terminal spine long and stout. Flower-heads about 1 in. diameter, rather scanty, on short stalks, florets purple. Abundant. A. or B. 7—10.

CONTROL MEASURES : See below.

**THISTLE, Welled** (*Carduus crispus*).

Stem erect, branched, 2—3 ft., cottony above, spinous to base. Leaves wavy, more or less deeply cut, finely

spinous, with cottony down beneath. Flower-heads much smaller than in Spear Thistle (above), about  $\frac{1}{2}$  in. diameter, purple, rarely white. A. or B. 6—9.

**CONTROL MEASURES :** Destroy seedlings by surface cultivation in Spring, and hoeing or spudding where necessary. Older plants must be spudded out in June, and perhaps again in early August, to prevent seeding. Prevention of seeding, combined with good cultivation, will keep down these thistles. Spraying, as for Charlock, will prevent seeding.



Fig. 14.

**SHARP-POINTED TOADFLAX.**

(*Linaria elatine*.)

(About  $\frac{2}{3}$  nat. size.)

**NOTES :** See Creeping Thistle for pests encouraged. The Ministry of Agriculture has power to require occupiers of land to destroy Spear Thistle within a specified time and in a stated manner.

**TOADFLAX, Round-leaved** (*Linaria spuria*). Fluellin.

Stem branched, prostrate, hairy,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft. long. Leaves 1 in. long, roundish to egg-shaped, with short stalks. Flowers 2-lipped,  $\frac{1}{2}$  in., pale yellow, upper lip purple, spur slender, recurved. The Sharp-pointed Toadflax (*Linaria elatine*) (Fig. 14) differs mainly in its triangular pointed leaves, and is equally common on most soils. A lover of chalk, but frequent in all parts. A. 7—10.

**CONTROL MEASURES :** See below.

**TOADFLAX, Yellow** (*Linaria vulgaris*). Yellow Snapdragon.

Stem branched, erect, 1—2 ft., usually very leafy. Leaves narrow lance-shaped, glaucous, 1—3 ins. long. Flowers in terminal clusters, two-lipped, spurred, yellow and orange, 1 in. long. A typical weed of chalky districts, often entirely absent from others. P. 7—10.

**CONTROL MEASURES :** Destroy seedlings and remove the roots as much as possible during Spring cultivation, and hoe out the plants to prevent seeding when cleaning fallow crops.

**NOTES :** The Yellow Toadflax is used medicinally as an alterative in liver complaints. A yellow dye is also obtainable from the flowers. Toadflax is suspected of poisonous properties.

**WHITLOW-GRASS, Common** (*Draba verna*). Vernal Whitlow-grass.

Stemless, but with flower-stalks rising from 1—3 ins. or more. Leaves in rosette,  $\frac{1}{2}$ —1 in. long, lance-shaped to oblong, toothed. Flowers in small clusters, about  $\frac{1}{8}$  in. diameter, petals 4, white. Pods  $\frac{1}{4}$  in., oblong, on longish stalks. Common on light soils, but seldom doing serious harm. A. 3—5.

**CONTROL MEASURES :** Not likely to be a troublesome weed. On dry stony land where it occurs, the usual methods of cultivation should keep it in check.

**WOUNDWORT, Corn** (*Stachys arvensis*). Field Woundwort.

Stem more or less erect, weak, square, branched at the base, sometimes rooting,  $\frac{1}{2}$ —1½ ft. Leaves  $\frac{1}{2}$  in. long, egg-shaped to heart-shaped, with rounded teeth, growing in opposite pairs. Flowers 2-lipped, in whorls of 4—6, corolla minute, purplish, marked with white. Locally common, preferring gravel and sand. A. 4—10.

**CONTROL MEASURES :** The usual methods of cultivation

should be sufficient, but it may be necessary to resort to hand pulling in cereal crops.

**YELLOW RATTLE, Great** (*Rhinanthus major*). Cock's-comb.

Closely resembling Common Yellow Rattle (see Grassland Weeds), but differing in its choice of arable land, its larger size, more branched habit of growth, and denser clusters of larger flowers. Like the commoner meadow species, it is a partial parasite, taking a portion of its aliment from the roots of its neighbours. Local. A. 5—7.

**CONTROL MEASURES :** Avoid cereal crops for two or three years, and devote attention to the destruction of seedlings by surface cultivation, followed by the thorough hoeing of root crops. Laying down to pasture for some years and close grazing with sheep, would largely reduce the weed, or perhaps exterminate it.

## SECTION II.

### WEEDS OF MEADOWS AND PASTURES.

**AGRIMONY, Common** (*Agrimonia Eupatoria*). Cockleburrs. Church Steeple.

Stem erect, usually unbranched, 1—2 ft., hairy. Leaves 3—6 ins. long, pinnate, with 3—10 pairs of leaflets, edges notched. Flowers  $\frac{1}{2}$  in. diameter, many, in dense tapering spike, yellow. Fruits with hooked spines attached, readily adhering to animals, etc. Common. P. 6—8.

**CONTROL MEASURES:** Mow down to prevent seeding, and give a good dressing of Basic Slag. It is only abundant on poor neglected land.

**NOTES:** Used in medicine as a astringent and diuretic, and has been employed for dyeing. The hooked fruits are distributed by animals, and their presence in quantity in the wool of sheep reduces its value. The Hop Mildew also attacks this plant.

**BARTSIA, Red** (*Bartsia Odontites*). See Section I.

**CONTROL MEASURES:** Manuring to encourage other herbage, cutting the weed to prevent seeding and feeding off with sheep.

**BARTSIA, Yellow** (*Bartsia viscosa*). Viscid Bartsia.

Closely related to Red Bartsia (above), but with a usually unbranched, viscid stem, and yellow flowers. Semi-parasitic. Very local. A. 6—10.

**CONTROL MEASURES:** As previous species.

**BEDSTRAW, Water** (*Galium palustre*). Water Goosegrass. Water Cleavers.

Stems more or less straggling and prostrate,  $\frac{1}{2}$ —3 ft. long, branched, weak, square. Leaves  $\frac{3}{4}$  in. long, narrow, growing in whorls of 4—6. Flowers minute, white, corolla with 4 segments. Common. P. 6—8.

**CONTROL MEASURES:** As following species.



**BEDSTRAW, Yellow** (*Galium verum*). Lady's Bedstraw.  
Yellow Goosegrass. Rennet-weed.

Stems more or less erect, often partly prostrate, branched, square, from 1—3 ft. long. Leaves  $\frac{1}{2}$ —1 in. long, narrow, in whorls of 8—12. Flowers minute, corolla with 4 segments, yellow. Common. P. 6—9.

**CONTROL MEASURES :** Prevention of seeding by cutting, where possible, combined with good manuring.

**NOTES :** Yellow Bedstraw has been used in medicine as a diuretic and alterative. A red dye is also obtainable from the roots and a yellow dye from the flowers.

**BINDWEED, Common** (*Convolvulus arvensis*). See Section I.

**CONTROL MEASURES :** Not common on grass land, and may be kept down by harrowing in Spring, and good manuring of meadows. Unlikely to appear on closely grazed pasture land.

**NOTES :** If eaten in large quantities, is said to have injurious effects on animals, and pigs are supposed to have been killed by it. Small quantities appear to be harmless.

**BLACKBERRY, Common** (*Rubus fruticosus*). Bramble.

Stems long, stout, straggling, covered with prickles. Leaves pinnate, with usually 5 egg-shaped, notched leaflets. Flowers in erect clusters, petals 5, white or pink. Fruits black, edible. Abundant. P. 6—9.

**CONTROL MEASURES :** Cutting down regularly is the usual method; the only alternative is to dig out the roots. Keep hedgerows well trimmed.

**NOTES :** Valued for its well-known fruit, and sometimes cultivated. Used also medicinally, having astringent and tonic properties. A syrup and extract of Blackberry are official in the U.S. Pharmacopœia.

The Raspberry Aphis and Raspberry Beetle both feed on the Bramble.

**BROOM, Common** (*Cytisus scoparius*).

A woody shrub, 3—6 ft. high, with green, furrowed, hairy branches. Leaves made up of 1—3 leaflets, inversely egg-shaped. Flowers pea-shaped, 1 in. long, yellow. Fruit a black pod 1—2 ins. long. Common. A typical hater of lime. P. 5—7.

**CONTROL MEASURES :** On a large scale the only method is burning, and grubbing out the roots later. After that, young plants must be persistently dug up or pulled out as fast as they appear, and a good dressing of Lime given to discourage their growth.

**NOTES :** Contains a narcotic poison and has proved fatal to animals. Under normal conditions, however, animals are not likely to eat it to an injurious extent. Medicinally Broom has a diuretic and cathartic action, and is an official drug in the British Pharmacopœia.

**BUGLE, Common** (*Ajuga reptans*). Sicklewort.

Stems square, branched,  $\frac{1}{2}$ —1 ft. Lower leaves inversely egg-shaped, rather narrow, 2 ins. long, stalked, upper oblong, stalkless. Flowers in whorled spikes, corolla 2-lipped,  $\frac{1}{2}$  in. long, blue, purplish, or rose-pink. Common, spreading rapidly by runners. P. 5—6.

**CONTROL MEASURES :** Phosphatic manures will discourage this weed, and sheep will keep it down on grazing land.

**BURDOCK, Common** (*Arctium Lappa*).

Stem erect, stout, branched, 2—4 ft. high. Leaves 9—12 ins. long or more, egg-shaped to heart-shaped, usually with whitish down beneath. Flower-heads about 1 in. diameter, purple. Fruiting heads with hooked bristles, readily attaching to animals, etc. Common. B. 7—9.

**CONTROL MEASURES :** Spudding out the young plants in the Spring, and cutting down the second year plants to

prevent seeding. The hooked fruits are distributed by animals and may be a nuisance by getting into the wool of sheep.

NOTES: Used medicinally as a blood purifier. The fungus causing *Chrysanthemum Rust* is also found on Burdock.

**BURNET, Salad** (*Poterium Sanguisorba*). Pimpinella.

Stem more or less erect,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., branched. Leaves pinnate, 3—9 ins., with 5—10 pairs of leaflets. Flower-heads about  $\frac{1}{2}$  in. diameter, globular, reddish purple, growing at summits of long stalks. Common. P. 6—8.

CONTROL MEASURES: May be reduced by cutting and manuring if necessary.

NOTES: Not altogether a harmful plant, as animals eat it freely in a young state. On poor chalky pastures it is useful. It is used in salad on the Continent.

**BUTTERBUR, Common** (*Petasites vulgaris*). Wild Rhubarb.

Flower stalks  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., erect, stout, often tinged purple, surmounted by a dense cluster of lilac flowers. These appear in March, before the leaves. Leaves long-stalked, roundish, or heart-shaped, sometimes 3 ft. across, often with cobweb-like growth upon them. Underground stems spreading rapidly. Abundant in places. P. 3—4.

CONTROL MEASURES: Continuous cutting of both leaves and flower stems, to exhaust the roots and prevent the formation of seed. Manuring reduces it, also draining.

**BUTTERCUP, Bulbous** (*Ranunculus bulbosus*). Crow-foot. Goldyknobs.

Readily distinguished from the other common Buttercups (see Section I.) by the swollen, bulb-like bases of its stems. The plant has no runners (as in the Creeping Buttercup),

and the sepals of the flowers always bend downwards to the stalks beneath them. Abundant. P. 5—7.

CONTROL MEASURES : As following species.

**BUTTERCUP, Common** (*Ranunculus acris*).

See Section I.

CONTROL MEASURES : Manuring with Basic Slag, or Superphosphate on light land, will promote better herbage. In pastures buttercups should be cut to prevent seeding. In meadows which are cut annually they are less injurious. Geese will often pull up the bulbous species, in damp pastures.

NOTES : This and the following species are both poisonous and have often proved fatal to farm animals, when eaten green in large quantities, but after drying in hay they are harmless. Cows rarely eat Buttercups, but when they do a bitter taste is imparted to the milk.

**BUTTERCUP, Creeping** (*Ranunculus repens*). See Section I.

CONTROL MEASURES : Being prevalent on sour land, a dressing of Lime or Basic Slag reduces it. Meadows should be well harrowed in the Spring, to drag out the creeping runners. If very abundant it is best to plough up the field, thoroughly clean by means of one or two root crops, and sow down to grass again with reliable seed.

NOTES : The least poisonous Buttercup, though sheep are said to have been killed by it. More serious as an arable weed.

**CAMPION, Bladder** (*Silene inflata*). See Section I.

**CAMPION, Red** (*Lychnis diurna*). See Section I.

**CAMPION, White** (*Lychnis vespertina*). See Section I.

CONTROL MEASURES : Manuring of meadows, and periodical cutting in pastures and along the borders of

fields and ditches will keep these plants in check. Prevent seeding.

**CARROT, Wild** (*Daucus Carota*). See Section I.

**CONTROL MEASURES:** Prevent seeding by cutting in pastures, or spudding out in meadows. The improvement of other herbage by manuring will reduce it. It might be advisable to break up and cultivate land very badly infested.

**NOTES:** This is the plant from which the cultivated carrot was produced. The Seeds Act requires dealers to declare the presence of Wild Carrot in seeds, if exceeding 1 per cent. in Clovers or 2 per cent. in Grasses. The use of seed containing more than 5 per cent. of weed seeds is illegal.

**CAT'S-EAR, Long-rooted** (*Hypochaeris radicata*).

Stemless. Leaves 3—9 ins. long, more or less cut into backward-pointing lobes, as in Dandelion, rough. Flower-stalks 1 ft. or more in height, branched, leafless, bearing large flower-heads singly at their summits, heads 1—1½ ins. across, bright yellow. Fruiting heads feathery, as in Dandelion. Common. P. 6—9.

**CONTROL MEASURES:** Treatment with Basic Slag to increase the growth of clovers and other herbage. Spudding out to prevent seeding, should be done where possible.

**CELANDINE, Lesser** (*Ranunculus ficaria*). Pilewort. Figwort.

Stems mainly prostrate, branched below. Leaves heart-shaped, about 1 in. diameter, but very variable, on long stalks. Flowers 1 in. diameter, growing one on each stalk, petals 8—12, pointed, bright golden yellow. Roots swollen, tuber-like. Common. P. 3—5.

**CONTROL MEASURES:** As Buttercups.

**NOTES:** Poisonous, like others of the genus, and is said



to have caused the death of cattle. Possesses astringent properties and is employed medicinally.

**CENTUARY, Common** (*Erythræa Centaurium*).

Stem erect,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., branched near summit, free from hairs. Leaves narrow above, more or less egg-shaped below, varying from  $\frac{1}{2}$ —2 ins. in length. Flowers about  $\frac{1}{4}$  in. diameter, or more, corolla with 5 pointed segments, usually bright pink. Frequent. A. 6—9.

**CONTROL MEASURES :** Prevention of seeding by spudding or cutting, and the use of nitrogenous manures and superphosphate.

**CHICKWEED, Mouse-ear** (*Cerastium vulgatum*). See Section I.

**CONTROL MEASURES :** Good manuring, harrowing, and close grazing with sheep.

**CINQUEFOIL, Creeping** (*Potentilla reptans*).

See Section I.

**CONTROL MEASURES :** As previous species.

**CLEMATIS, Wild** (*Clematis Vitalba*). Traveller's Joy. Oldman's-beard.

A hedgerow shrub, climbing by its twining leaf-stalks, stems woody, 6—12 ft. or more in height. Leaves opposite, usually with 3—5 leaflets, each egg-shaped to heart-shaped, and 2—3 ins. long. Flowers without petals, but with 4 greenish-white sepals, and many conspicuous stamens. Frequent on chalky soils. P. 7—8.

**CONTROL MEASURES :** Good hedge trimming.

**NOTES :** Poisonous in all parts, but rarely fatal. It is a violent purgative and irritant.

**COLTSFOOT** (*Tussilago Farfara*). See Section I.

**CONTROL MEASURES :** Manurial treatment with nitrate of



soda, sulphate of ammonia or farmyard manure reduces it. Draining may be necessary.

NOTES : For arable land and other notes see Section I.

**COMFREY, Common** (*Symphytum officinale*).

Stem erect, 1—3 ft., branched, angled, rough with stiff hairs. Leaves 6—12 ins. long, narrowish egg-shaped, rough. Flowers in branched clusters, corolla tubular, with 5 segments,  $\frac{3}{4}$  in. long, usually reddish or purple, but often whitish. Common. P. 5—7.

CONTROL MEASURES : Regular cutting and manuring to encourage other vegetation.

**COWSLIP, Common** (*Primula veris*). Paigle. Herb Peter. Peterwort.

Stemless. Leaves 3—6 in. long, more or less egg-shaped to oblong, wrinkled and toothed. Flower-stalks  $\frac{1}{2}$ —1 ft., surmounted by flowers in umbels, corolla funnel-shaped, with 5 lobes, yellow, fragrant. Abundant. P. 4—5.

CONTROL MEASURES : Manuring to encourage more useful plants, grazing with sheep, and cutting.

NOTES : Sometimes employed in medicine as a sedative.

**COW-WHEAT, Common** (*Melampyrum pratense*).

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., branched, spreading. Leaves 1—2 ins. long, mainly narrow-lance-shaped, with short stalks or none, growing in opposite pairs. Flowers tubular, 2-lipped, pale yellow. Semi-parasitic. Local. A. 6—9.

CONTROL MEASURES : Cutting, where the weed grows in patches, or along margins of fields adjoining woods. Good manurial treatment otherwise.

NOTES : Injurious if eaten in very large quantities, but for practical purposes is not poisonous.

**CRANE'S-BILL, Cut-leaved** (*Geranium dissectum*). See Section I.

**CRANE'S-BILL, Dove's-foot** (*Geranium molle*).

See Section I. (Fig. 15.)

**CRANE'S-BILL, Meadow** (*Geranium pratense*). Large Crane's-bill. Wild Geranium.

Stem erect, 2—4 ft., branched towards summit, clothed with soft hairs. Leaves 3—5 ins. diameter, roundish, with about 7 deeply-cut lobes and long stalks. Flowers



Fig. 15.

**DOVE'S-FOOT CRANE'S-BILL.**

(*Geranium molle*.)

(About  $\frac{2}{3}$  nat. size.)

numerous, handsome, 1—1½ ins. across, petals 5, purple. Frequent in damp meadows. P. 6—9.

**CONTROL MEASURES:** Cutting to prevent seeding. Meadows should be mown early, to suppress these and other weeds.

**NOTES:** Crane's-bills are attacked by the fungus causing Hop and Strawberry mildew.

**CUDWEED, Marsh** (*Gnaphalium uliginosum*). See Section I.

CONTROL MEASURES : As " Centaury."

NOTES : Has been employed medicinally, having an astringent action.

**DAISY, Common** (*Bellis perennis*). Gowan. Bachelor's Buttons. Billy Buttons.

Usually stemless, but often spreading horizontally by means of runner-like growths on closely-cut lawns, etc. (Plate VII.) Leaves from 1—3 ins. long, roughly inversely egg-shaped, with a broad middle rib. Flower-stalks 1—6 ins., surmounted by a single flower-head about 1 in. diameter, outer florets white or red-tinged, central disk yellow. Abundant. P. 1—12.

CONTROL MEASURES : Promote the growth of taller plants by the use of nitrogenous manures. (For treatment on Lawns, see Section III.)

**DAISY, Ox-eye** (*Chrysanthemum Leucanthemum*). Moon Daisy. Dog Daisy. Wild Marguerite.

Stem 1—2 ft., erect, usually branched. Leaves oblong, more or less deeply cut, the lower inversely egg-shaped, with stalks, the upper stalkless and partly embracing the stem. Flower-heads often 2 ins. across, growing singly, outer florets white, central disk yellow. Abundant. P. 6—7.

CONTROL MEASURES : Mow meadows as early as possible. Improve soil conditions by a good dressing of 4 to 6 cwt. of Basic Slag, 1 cwt. of Sulphate Ammonia and 2 cwt. of Kainit per acre. A light dressing of lime is also useful.

NOTES : If eaten by cows, is said to give the butter an objectionable taste.

**DANDELION, Common** (*Taraxacum vulgare*). See Section I.

CONTROL MEASURES : The flowers and leaves are destroyed by solutions of Iron and Copper Sulphates, in

the strengths used for Charlock, but the roots are uninjured. Spraying will prevent seeding. Manuring, as for the previous species, and close grazing are recommended.

**DOCK, Broad-leaved** (*Rumex obtusifolius*). See Section I.

**DOCK, Curled** (*Rumex crispus*). See Section I.

**DOCK, Red-veined** (*Rumex sanguineus*). Bloody Dock.

A typical Dock (see Section I.), growing from 2—4 ft. high, with mainly heart-shaped leaves from 5—10 ins. in length. The veins of these are usually conspicuously red, and have given this species its popular name. Common. P. 7—8.

**CONTROL MEASURES:** Pulling out by hand in wet weather, or removal with the docking iron. Burn all the plants removed. Encourage other vegetation with artificial manures, and mow early.

**NOTES:** See Section I. for Government Orders and other notes.

The root of the Curled Dock is used in medicine as a laxative. Boiled Dock leaves are used as pig food in the North, and deer are fond of the plants, though they are avoided by farm animals.

**DODDERS, Various** (*Cuscuta* spp.) See Section I.

**CONTROL MEASURES:** Cutting and burning, as recommended for arable land, and re-seeding the patches afterwards. Spraying with Iron Sulphate might also be tried on grass land.

**NOTES:** See Section I. for the Seeds Act regulations.

**DYER'S GREEN-WEED** (*Genista tinctoria*). Dyer's Broom. Woadwax.

A shrubby plant, with branched stems from 1—3 ft. high. Leaves mainly lance-shaped, about 1 in. long, growing closely to stems. Flowers  $\frac{1}{2}$  in., pea-shaped, yellow. Frequent. P. 7—9.

**CONTROL MEASURES:** Close grazing with sheep in early Spring. Mowing down to prevent seeding. Manuring



1. Rayless Mayweed in flower.



2. Common Barberry in fruit.

PLATE V.





with 8 to 10 cwt. of Basic Slag per acre to encourage clovers, and giving 1 cwt. of Sulphate of Ammonia per acre in Spring for several years.

NOTES : Valueless as food and is said to taint the milk of cows if they eat it, which they rarely do. Formerly used for dyeing.

**EYEBRIGHT, Common** (*Euphrasia officinalis*). Euphrasy.  
Bright-eye.

Stem erect, varying from 1—9 ins. or more in height, branches numerous, opposite. Leaves opposite, about  $\frac{1}{4}$ — $\frac{1}{2}$  in. long, egg-shaped to lance-shaped, more or less cut or lobed. Flowers usually clustered, 2-lipped,  $\frac{1}{4}$ — $\frac{1}{2}$  in. long, white or pale lilac, with darker veins and a blotch of yellow. Semi-parasitic. Abundant. A. 5—9.

CONTROL MEASURES : Shows deficiency of Phosphates. Give 5 or 6 cwt. of Slag per acre on heavy land, or 3 to 4 cwt. of Super on light land.

NOTES : Used medicinally in the preparation of eye lotions.

**FERN, Bracken** (*Pteris aquilina*). Brake.

Varies from 1—6 ft. in height, with large branched fronds, each 2—3 ft. Being a true fern, the Bracken does not flower, but spreads rapidly by means of its stout, underground rootstocks which creep over immense areas. Abundant in many districts, but a typical hater of lime. P.

CONTROL MEASURES : Regular cutting for several years in May and June, or better at monthly intervals from June to September. Bruising the young shoots and knocking down with sticks, or by means of chain harrows, has been recommended. After cutting, a dressing of lime is beneficial.

The best method is spraying with dilute Sulphuric Acid (Oil of Vitriol). On rough hill pastures this may be done with knapsack sprayers. The water must first be put in the sprayer, and the acid very carefully and slowly added, in the proportion of one pint to  $4\frac{1}{2}$  gallons of water. The

first spraying should be given early in July and a second in August. Cut surviving plants the following year.

Breaking up and cultivating a pasture, exterminates Bracken most effectively.

NOTES : Suspected of poisonous properties, but no really authentic cases seem to be recorded. It has been used as

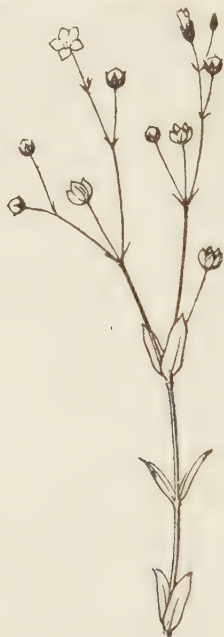


Fig. 16.

PURGING FLAX.  
(*Linum catharticum*.)  
(About  $\frac{2}{3}$  nat. size.)

fodder and even made into silage. It makes a good litter and is much used for this purpose; it has a high manurial value. Often used as a substitute for straw for thatching and similar purposes.

**FLAX, Purging** (*Linum catharticum*). Dwarf Flax. Fairy Flax. (Fig. 16.)

Stem 1—10 ins., branched above, wiry and slender,

smooth, greyish-green. Leaves minute, narrow-oblong, growing in opposite pairs. Flowers usually less than  $\frac{1}{4}$  in. diameter, drooping in bud, petals 5, white. Abundant. A. 5—9.

**CONTROL MEASURES :** Good manurial treatment, combined with early cutting to prevent seeding.

**NOTES :** Suspected of poisonous properties, but probably large quantities would be necessary to cause injury. Has a cathartic action and is used medicinally.

### **FUNGI, Various.**

It is impossible here to describe any species of Fungi in detail. Most of them are mushroom-like plants, varying enormously, however, in size and shape, but all agree in being both leafless and flowerless. They multiply not only by means of minute spores, but also by branching whitish threads, known as *hyphæ*, which spread rapidly beneath the surface of the ground. When occurring in any considerable quantities, they may cause much damage to grassland. (See also Section III. for details concerning "Fairy Rings," etc.)

**CONTROL MEASURES :** Good manuring with a complete fertiliser in the Spring; or apply the following separately : 4 to 6 cwt. of Basic Slag (or Superphosphate for light land), 1 cwt. of Sulphate of Ammonia and 2 cwt. of Kainit per acre. Liming, and the use of Basic Slag alone are also beneficial. Watering the patches with a 4 per cent. Sulphate of Iron solution kills the Fungi after three or four applications.

**GARLIC, Broad-leaved** (*Allium ursinum*). See Section I.

**GARLIC, Crow** (*Allium vineale*). See Section I.

**CONTROL MEASURES :** Exhausting the bulbs by constant cutting or spudding of the leaves; pulling up the plants by hand in June, when the ground is wet; digging up the bulbs, or paring off and burning the soil containing them, the bare patches being re-seeded.

NOTES: Milk from cows which eat this plant is badly tainted. If it cannot be exterminated, cows must be kept away from it, and other stock grazed in the field.

**GENTIAN, Field** (*Gentiana campestris*).

Stem erect,  $\frac{1}{2}$ —1 ft., branched above. Leaves egg-shaped, pointed, in opposite pairs. Flowers more or less clustered, corolla 1 in. long, tubular, with 4 segments, pale lilac or purplish. Common. A. 7—10.

CONTROL MEASURES: Prevent seeding by cutting in pastures and the early mowing of meadows.

NOTES: The root of the European Gentian (*G. Lutea*) is an official drug, being a bitter tonic; Field Gentian has similar properties and is sometimes used.

**GOATSBEARD, Common** (*Tragopogon pratensis*). See Section I.

CONTROL MEASURES: As "Cat's Ear."

**GORSE, Common** (*Ulex europæus*). Furze. Whin.

A very spinous, woody shrub, 3—6 ft. high, much branched. Leaves of 3 leaflets in young plants, very small when mature, being mainly replaced by stiff spines, 1—2 ins. in length. Flowers clustered, pea-shaped, nearly 1 in. long, bright yellow. Often very abundant, but a typical hater of lime. P. 2—4, and again 8—12.

CONTROL MEASURES: Burn in suitable weather. Stems rot in a few months and may be broken off below ground level. When ground is once cleared, young plants may be kept down by cutting or grazing. Apply 8 to 10 cwt. Basic Slag per acre, and sow bare patches with grass and clover. Apply 1 cwt. of Sulphate of Ammonia later. Sheep folded on newly cleared land will prevent Gorse reappearing.

NOTES: Animals eat gorse in the young state and it is sometimes grown for fodder. It makes good fuel, is useful

as cover for game and forms a valuable hedge plant. Gorse is one of the alternate hosts of the Bean Aphis.

**GORSE, Dwarf** (*Ulex nanus*). Small Furze. Small Whin.

Closely resembling Common Gorse (above), but usually much smaller, often no more than 1 ft. in height. Frequent. P. 7—10.

CONTROL MEASURES : As previous species.

**GOUTWEED** (*Ægopodium Podagraria*). See Section I.

CONTROL MEASURES : Persistent cutting or spudding. Digging up the roots is advisable.

**GRASS, Barren Brome** (*Bromus sterilis*). Black Grass.  
Oat Grass.

Stems erect, about 2 ft. high, smooth, with leaves. Leaves flat,  $\frac{1}{4}$  in. across, downy. Flower-clusters loose, with few long branches, drooping. Spikelets with long awns, 2 ins. Common. A. 6—7.

CONTROL MEASURES : Mow hay early, and cut in pastures in early June to prevent seeding. Manure, as for following species.

**GRASS, Common Bent** (*Agrostis vulgaris*). See Section I.

CONTROL MEASURES : Liming, at the rate of 8 to 10 cwt. per acre, reduces all species of *Agrostis*. Good manuring is also necessary; Kainit, Superphosphate, and Nitrate of Soda are recommended. Cut before seeding.

**GRASS, Couch** (*Agropyron repens*). See Section I.

CONTROL MEASURES : Not troublesome on grass land, and is soon crowded out under the influence of good manuring.

**GRASS, Creeping Soft** (*Holcus mollis*). Yorkshire Fog.  
(See also Meadow Soft Grass, which is the true Yorkshire Fog.)

Closely related to, and nearly resembling the Meadow Soft Grass (see below), but differing mainly in having smooth stems with hairy joints, and an extensively creeping rootstock. It is also usually a more slender plant. Frequent. P. 6—8.

CONTROL MEASURES : As Meadow Soft Grass.

**GRASS, Floating Foxtail** (*Alopecurus geniculatus*). Marsh Foxtail.

Stem  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., mainly prostrate, rooting at the joints. Leaves flat, roughish. Flower-clusters dense, cylindrical, resembling small fox's tail, 1— $1\frac{1}{2}$  ins. long. Frequent in wet places. P. 5—8.

CONTROL MEASURES : Draining ; followed by liming. (As to ponds and ditches see Section III.)

**GRASS, Mat** (*Nardus stricta*). Moor Grass. Moor Mat-grass. Mat Weed.

Stems varying from 2—8 ins. in height, erect, angular, many long sheaths at base. Leaves rigid, almost bristle-like, with channels. Flower-cluster a slender solitary spike, 1—3 ins. long. Common on dry soils, but seldom or never occurring where lime is present. P. 6—7.

CONTROL MEASURES : Manuring to encourage more luxuriant herbage.

**GRASS, Meadow Barley** (*Hordeum pratense*). Wild Barley. Squirrel's-tail. Adam-and-Eve. Waybent.

Stem slender, 1—2 ft., rough towards summit. Leaves mainly flat, narrow, rough above and hairy below, often more or less rolled. Flower-cluster in a barley-like spike, 1—3 ins. long, and about  $\frac{1}{2}$  in. broad, pale green. Rootstock creeping extensively. Common in damp meadows. P. 6—7.

CONTROL MEASURES : Cut to prevent seeding in pastures, or keep closely grazed down. Manure meadows well and cut, if possible, before this grass flowers.



**GRASS, Meadow Soft** (*Holcus lanatus*). Yorkshire Fog.  
(See also Creeping Soft Grass.) (Fig. 17.)

Stem erect, or partly prostrate,  $\frac{1}{2}$ —2 ft. high, slender.  
Leaves flat, covered with very soft down. Flower-clusters



FIG. 17.

MEADOW SOFT GRASS.

(*Holcus lanatus*.)

(About  $\frac{1}{2}$  nat. size.)

2—4 ins., often tinged pink, spikelets less than  $\frac{1}{4}$  in. Whole plant downy. Abundant. P. 6—8.

**CONTROL MEASURES :** Good manuring to improve the nature of the soil. Mowing the flowering heads in pastures, to prevent seeding. Avoid sowing the seeds when laying down land to grass.

**NOTES :** A hairy grass, which animals usually avoid.

In damp pastures, however, it is of a smoother nature, and as cattle will eat it in this form, is less objectionable.

The Seeds Act requires dealers to declare the presence of this grass in seed offered for sale, if exceeding 1 per cent. in clovers or 2 per cent. in grasses. The sale or use of seed containing more than 5 per cent. of weed seeds is illegal.

**GRASS, Quaking** (*Briza media*). Quaker Grass. Lady's-hair. Quacker Ducks.

Stems  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., prostrate below, and creeping. Leaves flat. Flower-clusters roughly triangular, of many egg-shaped, drooping spikelets on slender wiry stalks, green, often tinged purple. Handsome and graceful. Common. P. 6—7.

**CONTROL MEASURES:** Improve the soil by liberal manuring.

**GRASS, Soft Brome** (*Bromus mollis*).

Stem  $\frac{1}{2}$ —2 ft., hollow. Leaves flat,  $\frac{1}{4}$  in. across, soft and downy. Flower-clusters roughly oval in outline, 2—3 ins. long, often partly drooping, spikelets oblong, about  $\frac{1}{2}$  in. long. Whole plant covered with fine, soft hairs, grey-green. A. or P. 5—7.

**CONTROL MEASURES:** As Barren Brome Grass.

**NOTES:** The Seeds Act requires dealers to declare the presence of this grass in seed offered for sale, if exceeding 1 per cent. in clovers or 2 per cent. in grasses. The sale or use of seed containing more than 5 per cent. of weed seeds is illegal.

**GRASS, Tufted Hair** (*Aira cæspitosa*). Tussock Grass.

Stems 2—4 ft., smooth, glossy. Leaves flat, rough. Flower-clusters spreading, spikelets  $\frac{1}{4}$  in. long, many, glossy, often tinged purple. Common in damp places. P. 6—7.

**CONTROL MEASURES:** Liming and manuring, also draining where necessary. The tussocks may be dug up or grubbed out with a mattock.

**GRASS, Wall Barley** (*Hordeum murinum*). Wild Barley.

Squirrel's-tail. Adam-and-Eve. Waybent. (Fig. 18.)

Closely resembling Meadow Barley Grass (above), but usually rather smaller, and only of annual duration.

CONTROL MEASURES : As Meadow Barley.



FIG. 18.

WALL BARLEY GRASS.

(About  $\frac{1}{2}$  nat. size.)

(*Hordeum murinum*.)

**GRASS, Waved Hair** (*Aira flexuosa*).

Stems erect,  $\frac{1}{2}$ —2 ft., glossy. Leaves conspicuously short, blunt, almost threadlike, grooved. Flower-clusters erect, 2—6 ins., with spreading waved branches, spikelets less than  $\frac{1}{2}$  in. long, often brownish or purplish. Common in dry ground. P. 6—8.

CONTROL MEASURES : As Bent Grass.

**GRASS, White Bent** (*Agrostis alba*). See Section I.

CONTROL MEASURES: As Common Bent Grass; but draining may be necessary.

**GROUNDSEL, Common** (*Senecio vulgaris*). See Section I.

CONTROL MEASURES: Not a grass land weed; but, in common with others typical of arable land, may be found



Fig. 19.

**AUTUMNAL HAWKBIT.**

(*Leontodon autumnalis*.)

(About  $\frac{1}{2}$  nat. size.)

on the sites of old ricks and manure heaps, where the grass has been killed. Such areas should not be allowed to remain centres of weed distribution, but should be cleaned and resown with grass seed.

**HAWKBIT, Autumnal** (*Leontodon autumnalis*). Garkins.  
(Fig. 19.)

Stemless. Leaves 3—9 in. long, usually deeply lobed,

all springing from the root, nearly free from hairs. Flower-stalks  $\frac{1}{2}$ —2 ft. high, branched, becoming swollen above, flower-heads about 1 in. diameter, florets all strap-shaped as in Dandelion, bright yellow. Common. P. 7—9.

CONTROL MEASURES : As following species.

**HAWKBIT, Rough** (*Leontodon hispidus*). Hispid Hawkbit.

Differing from Autumnal Hawkbit (above) mainly in its slightly smaller size, its rough leaves, and its unbranched flower-stalks, each bearing a solitary flower-head which droops when in bud. P. (or B.) 6—9.

CONTROL MEASURES : Spudding out to prevent seeding. Treatment with Basic Slag to increase the growth of clovers and other herbage.

**HAWKSBEARD, Dandelion-leaved** (*Crepis taraxacifolia*).  
See Section I.

CONTROL MEASURES : As previous species.

**HAWKSBEARD, Smooth** (*Crepis virens*). See Section I.

CONTROL MEASURES : As previous species.

**HAWKWEED, Mouse-ear** (*Hieracium Pilosella*). Mouse's-ears.

Stems prostrate, creeping extensively. Leaves more or less oblong, 2—3 ins., white and downy beneath, hairy above. Flower-heads on separate stalks, 3—9 ins. high, heads up to 1 in. diameter, florets all strap-shaped, pale sulphur-yellow, often reddish beneath. Common. P. 5—8.

CONTROL MEASURES : As Hawkbits.

NOTES : The fungi causing Lettuce Mildew and Chrysanthemum Rust attack this and other Hawkweeds.

**HEATH, Cross-leaved** (*Erica Tetralix*).

Stems erect, woody,  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., branched. Leaves minute, barely  $\frac{1}{4}$  in. long, arranged in whorls of 4, crosswise.

Flowers handsome, egg-shaped, drooping, corolla about  $\frac{1}{4}$  in. long, waxen, rose-pink. Often abundant. P. 7—9.

CONTROL MEASURES : As Heather.

**HEATHER, Common** (*Calluna vulgaris*). Ling.

Stems woody, mainly erect, 1—2 ft., much branched. Leaves very minute, overlapping along the branches, and giving the latter a square appearance. Flowers numerous, small, rosy purple, rarely white. Often abundant, but a typical hater of lime. P. 7—9.

CONTROL MEASURES : Burning in dry weather, and removing the larger stems and roots later. Then give a good dressing of lime. Cultivation and re-seeding of infested areas will probably be necessary.

NOTES : A useful moorland plant. The young shoots are eaten by grouse. Heather is largely used for packing drain pipes, etc., for railway transport.

**HERB BENNET** (*Geum urbanum*). Wood Avens. Wild Geum.

Stems 1—3 ft., erect. Lowest leaves pinnate, long-stalked, with broad terminal leaflet, upper leaves very variable, often lance-shaped. Flowers about  $\frac{1}{2}$  in. diameter, petals 5, yellow. Fruiting heads with hooked bristles. Common. P. 6—8.

CONTROL MEASURES : The trimming of hedges and ditches should keep this plant in check sufficiently.

NOTES : A harmless plant and readily eaten by sheep and other animals. It has been largely used medicinally in the past.

**HOGWEED, Common** (*Heracleum Sphondylium*). See Section I.

CONTROL MEASURES : Cut regularly before seeding takes place, and give a dressing of a phosphatic manure.

NOTES : Readily eaten by cattle and other animals, and is often used as food for pigs and rabbits.



**HOP, Common** (*Humulus Lupulus*).

Stems twining, often 6 ft. or more, very rough. Leaves 3—4 ins. diameter, mainly deeply cut into 3—5 lobes. Male flowers in long clusters, 3—5 ins., female in roundish heads  $\frac{1}{2}$ — $1\frac{1}{2}$  ins. diameter, green or greenish-yellow. Male and female flowers occur on separate plants. Common. P. 7—8.

**CONTROL MEASURES :** Prevent seeding by cutting down during hedge trimming.

**NOTES :** The same species as the cultivated Hop used in the brewing of beer, and when growing wild is most likely an escape from cultivation. The Hop is attacked by an *Aphis* (*Aphis humuli*), the alternate hosts of which are the Damson or Blackthorn. It is also a host of the Hop and Strawberry Mildew.

**HORSETAIL, Field** (*Equisetum arvense*). See Section I.

**CONTROL MEASURES :** Draining is the only effective remedy. Regular cutting should be practised, particularly of the fruiting stems in the early Spring. A good dressing of lime is helpful.

**NOTES :** Said to be poisonous, particularly to horses and to a lesser extent to sheep. Comparatively harmless when green; but in America has proved fatal to horses, when eaten in hay in large quantities. The Marsh Horsetail (*E. palustre*) is known to be definitely poisonous, chiefly affecting cattle, as other animals avoid it.

**KNAPWEED, Black** (*Centaurea nigra*). See Section I.

**CONTROL MEASURES :** As following species.

**KNAPWEED, Greater** (*Centaurea Scabiosa*).

See Section I.

**CONTROL MEASURES :** Dress with Basic Slag, 5 or 6 cwt. per acre, every three years. Potash is also necessary; give 4 cwt. of Kainit per acre. Farmyard manure may be used in the intervals. Graze closely with sheep in the Spring. Prevent seeding as much as possible by cutting.

**LADY'S MANTLE, Common** (*Alchemilla vulgaris*).  
Dewcups.

Stems  $\frac{1}{2}$ —1 ft., mainly erect, round, hairy, branched, Root-leaves 2—4 ins. diameter, with 6—9 lobes, of pretty plaited appearance, stalks very long, stem-leaves much smaller, with shorter stalks. Flowers in loose clusters, very small, greenish-yellow. Common in moist grassland. P. 6—8.

CONTROL MEASURES : Manure well, chiefly with phosphatic and potash manures. Draining reduces it.

**LADY'S SMOCK** (*Cardamine pratensis*). Cuckoo Flower.  
Milkmaids. Bitter Cress.

Stems 1—1 $\frac{1}{2}$  ft., branched. Leaves pinnate, leaflets roundish on lower leaves, narrower and with shorter stalks on upper ones. Flowers about  $\frac{1}{2}$  in. diameter, petals 4, pale lilac or whitish. Pods narrow, 1—1 $\frac{1}{2}$  ins. long. Root-stock occasionally creeping. P. 4—6.

CONTROL MEASURES : As previous species.

**LOUSEWORT, Common** (*Pedicularis sylvatica*). Red Rattle.

Stems branched below, spreading,  $\frac{1}{4}$ — $\frac{3}{4}$  ft. high, often more or less prostrate. Leaves 1—3 ins., mainly deeply cut into narrow segments. Flowers 1 in. long, tubular, two-lipped, rosy red or purplish. Frequent. Semi-parasitic. P. 4—7.

CONTROL MEASURES : As following species.

**LOUSEWORT, Marsh** (*Pedicularis palustris*). Red Rattle.

Similar to Common Lousewort (above), but differing mainly in its larger size and more erect stems, which are branched above rather than below, and in its annual, instead of perennial duration. Also semi-parasitic. 5—9.

CONTROL MEASURES : As *Bartsia*. Sheep will eat *P. sylvatica* when young.

NOTES : Both species are to some extent poisonous, but

*P. sylvatica* is considered harmless in the young state.

*P. palustris* is very poisonous.

**MEADOWSWEET** (*Spiræa Ulmaria*). Queen-of-the Meadows. Wild Spiræa.

Stems erect, 2—4 ft., furrowed. Leaves 1—1½ ft. long, pinnate, springing mainly from below, leaflets deeply notched, some large and some small. Flowers small, in large clusters, 3—6 in. diameter, creamy-white, very fragrant. Common in damp places. P. 6—8.

**CONTROL MEASURES:** Cut down frequently, and keep ditches and margins of fields well trimmed. Manure well with phosphates and potash. Liming and draining reduce it.

**NOTES:** Has been used medicinally as an astringent and diuretic, and also in the making of herb beer. The Hop and Strawberry mildew attacks this plant.

**MEDICK, Black** (*Medicago lupulina*). See Section I.

**CONTROL MEASURES:** Chiefly found in temporary leys, where it may be useful on poor land. If objected to, take care to sow pure grass and clover seeds.

**NOTES:** A useful plant on dry chalky soils and is sown as sheep food. It is often included in a "seeds" mixture on poor soil, and sometimes sown with sainfoin.

**MILKWORT, Common** (*Polygala vulgaris*).

Stems numerous, 3—9 ins. high. Leaves about 1 in. long, mainly lance-shaped. Flowers about ¼ in. long, very irregular in shape, and varying in colour from pure white to pink, lilac, purple and blue. Common. P. 6—8.

**CONTROL MEASURES:** Discouraged by judicious manuring.

**MOSSES, Various.**

The Mosses form a large class of flowerless plants, seldom attaining a height of more than a few inches, but often occurring in immense patches in moist ground. They

produce no seeds, but multiply largely by means of minute spores, which, being exceedingly small and light, are scattered readily by even a light breeze. Mosses are often very prejudicial to the healthy growth of Grasses when they abound to any considerable extent.

**CONTROL MEASURES:** Draining, if on damp land. Liming in the Autumn, after harrowing. Manuring with suitable phosphatic and nitrogenous manures, together with Potash. On light dry land, harrowing, rolling, and grazing with sheep should be tried. Superphosphate (6 cwt. per acre), applied at the end of February, will destroy moss, usually in one season.

**NETTLE, Common** (*Urtica dioica*). See Section I.

**NETTLE, Small** (*Urtica urens*). See Section I.

**NIPPLEWORT, Common** (*Lapsana communis*). See Section I.

**CONTROL MEASURES:** Trimming of margins of fields and ditches, and cutting elsewhere to prevent seeding.

**ORCHIS, Spotted** (*Orchis maculata*).

Stems  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., bearing a few leaves, and surmounted by spike of flowers. Leaves lance-shaped, often spotted with purplish-brown. Flowers in dense spike, 2—5 ins. long, corolla 2-lipped, spurred, pale reddish purple or white, spotted. Frequent. P. 5—7.

**CONTROL MEASURES:** Draining, followed by judicious manuring.

**PARSLEY, Common Beaked** (*Anthriscus vulgaris*). See also Wild Beaked Parsley.

Closely related to Wild Beaked Parsley (below), but differing in its umbels of flowers occurring opposite the leaves along the stems, instead of at the ends of the branches, as in the other plant. It differs also in being of annual duration. 5—7.

**PARSLEY, Upright Hedge** (*Caucalis Anthriscus*).

Stem erect, 2—3 ft., slightly rough. Leaves deeply cut into narrow segments. Flowers in umbels of 5—12 rays, petals 5, very minute, white, often tinged pink. Abundant. A. 7—9.

**PARSLEY, Wild Beaked** (*Anthriscus sylvestris*). Hedge Parsley. Wild Chervil. Cow Parsley. Cow Mumble. Keck. Hemlock. Kelks.

Stem stout, erect, 2—3 ft. high, hollow, with grooves. Leaves cut into many fine segments, notched. Flowers in terminal umbels, petals 5, minute, white. Abundant. P. 4—6.

**CONTROL MEASURES:** These three Parsleys may be discouraged by dressing with Basic Slag, or Superphosphate, and Kainit. To prevent them seeding mow hay early, and cut down in pastures.

**NOTES:** See Section I. for Notes and arable treatment.

**PENNYWORT, Marsh** (*Hydrocotyle vulgaris*). Whiterot.

Stems prostrate, creeping, whitish. Leaves  $\frac{1}{2}$ — $1\frac{1}{2}$  ins. diameter, round, horizontal, with long stalk attached to centre beneath. Flowers very minute, in umbels often not exceeding  $\frac{1}{4}$  in. across, pinkish to pale green. Common in marshy land. P. 5—8.

**CONTROL MEASURES:** Draining, followed by a good dressing of lime.

**PIGNUT, Common** (*Conopodium denudatum*). Earthnut.

Stem branched, slender, 1—2 ft. high. Leaves deeply cut into exceedingly fine segments. Flowers in umbels at summits of stems and branches, umbels with 6—10 rays, drooping when in bud, petals 5, minute, white. Rootstock solid, brown, chestnut-like. Common, especially in sandy grassland. P. 5—6.

**CONTROL MEASURES:** Manuring to produce better herbage. Sheep eat it, and will keep it down on pastures.

**NOTES:** Pigs are fond of the tuberous roots, which have also been largely used as human food in the past.



**PLANTAIN, Greater** (*Plantago major*). See Section I.

**PLANTAIN, Hoary** (*Plantago media*). See Section I.

**PLANTAIN, Ribwort** (*Plantago lanceolata*).

See Section I.

**CONTROL MEASURES:** Smothering by growth of other herbage. Basic Slag, 6 to 8 cwt. in the Autumn, and  $1\frac{1}{2}$  cwt. Sulphate of Ammonia per acre in the Spring, will promote clovers and grasses respectively. Close grazing is advisable for two or three years before mowing. Avoid sowing plantains in grass mixtures.

**NOTES:** See Section I.

**RAGGED ROBIN** (*Lychnis Flos-cuculi*). Cuckoo-flower.  
Marsh Campion.

Stems erect, branched, swollen at the joints, 1—2 ft. high, furrowed, hairy or sticky above. Leaves lance-shaped, in opposite pairs. Flowers in loose, branching clusters, petals 5, each deeply 4-cleft, rosy-red. Frequent in moist meadows. P. 5—6.

**CONTROL MEASURES:** As Campions.

**RAGWORT, Common** (*Senecio Jacobæa*). Ragweed.  
Cankerwort. St. James' Wort. (Plate VI.)

Stems erect, stout, 1—3 ft., branched. Leaves deeply cut and lobed, lower with stalks, upper clasping the stem. Flower-heads in dense clusters, each head up to 1 in. diameter, outer florets strap-shaped, disk florets tubular, all bright yellow. Abundant. P. 6—9.

**CONTROL MEASURES:** Close grazing in the Spring with sheep, which eat the plant when young. Cut down or top the plants before they flower, to prevent seeding; three cuttings, from June to September, may be necessary. Pull up plants by hand in wet weather. A good dressing of Basic Slag or Superphosphate discourages Ragwort.

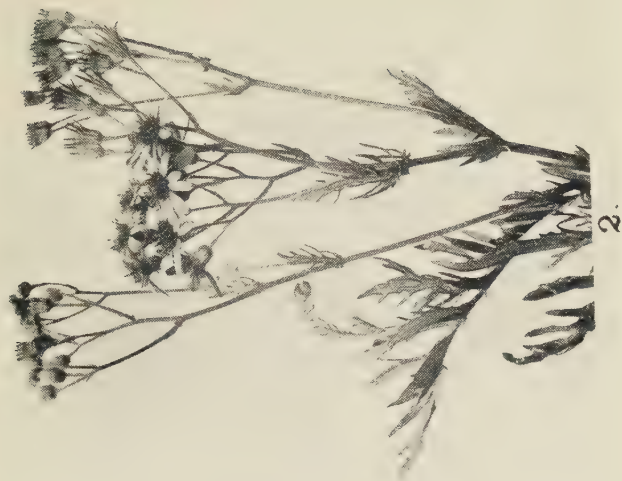
**NOTES:** Reports of poisoning by Ragwort come principally from Canada, New Zealand, and South Africa.





PLATE VI.

1. Nipplewort: Dwarfed form frequent in stubbles.



2. Ragwort in flower.



Experiments conducted in Britain by the Ministry of Agriculture show that the plant produces slow poisoning if eaten continually by cattle. They avoid the plant when growing, however, and it is chiefly dangerous when present in hay in large quantities. It seems to be comparatively harmless to sheep in the green state, but care should be exercised, as it has caused poisoning in New Zealand. An Order made by the Ministry of Agriculture empowers County Authorities to require the destruction of certain injurious weeds, including Ragwort. Such Authorities may serve a notice on any occupier of land, requiring the destruction of the weed within a specified time.

**REST HARROW, Common** (*Ononis repens*).

See Section I.

**REST HARROW, Spiny** (*Ononis spinosa*). See Section I.

**CONTROL MEASURES :** Always shows lack of phosphates. Give 7 to 8 cwt. Basic Slag per acre in Autumn, followed by 1 cwt. Sulphate Ammonia in Spring. Graze closely with sheep in May. Many old plants may be pulled up by using a spiked chain-harrow.

**NOTES :** A host of the Clover Stem Rot fungus.

**RUE, Meadow** (*Thalictrum flavum*).

Stem erect, 2—4 ft. high, branched, hollow, deeply grooved. Leaves very finely cut into narrow segments. Flowers in close clusters, very numerous, petals absent, sepals 4, pale yellowish or cream. Rootstock creeping extensively, yellow. Frequent. P. 7—8.

**CONTROL MEASURES :** Drainage, where practicable. Continual cutting to prevent seeding, and exhaust the underground stems.

**RUSH** (*Juncus* spp.).

The Rushes are nearly related to the Sedges (see below). They usually have creeping underground stems, and cylindrical leaves filled with a soft white pith. The flowers are minute, usually greenish or brown, and wholly lacking in elegance. These plants are generally of a distinctly

gregarious habit, and are often very troublesome on damp and marshy ground. They are mostly of perennial duration.

**CONTROL MEASURES:** Nothing but good drainage is permanently effective. See that ditches are not choked, and put in pipe drains if necessary. If springs exist, they should be tapped and the water drained off. Apply one or two tons of Lime per acre and 8 to 10 cwt. of Basic Slag. Keep the Rushes cut down, or graze them with horses.

**NOTES:** Rushes are of little value nowadays, but in the past were largely used for basket making, as well as for "rush-lights."

**SAFFRON, Meadow** (*Colchicum autumnale*). Autumn Crocus. Naked Ladies.

Leaves appear in Spring, and wither away in Summer. They are lance-shaped, dark green, flat, and from 6—10 ins. long. Flowers appear about August or September, rising up from the bare ground on naked stalks, and resembling large pale-purple crocuses. Underground stem is a solid corm of perennial duration. Local.

**CONTROL MEASURES:** Cutting or pulling off the leaves in the Spring and continuing to do so as fast as they appear. This kills the plants in one or two seasons. On a small scale digging up the whole plant is best. All parts must be burnt or deeply buried, out of reach of animals.

**NOTES:** This plant is very poisonous in all its parts, chiefly affecting cattle, horses and pigs. The poison is cumulative in its action and small quantities eaten frequently may prove fatal. Several pounds of the leaves are necessary to kill a cow at once. The seeds and corms are used medicinally, chiefly for rheumatic complaints.

**SCABIOUS, Devil's-bit** (*Scabiosa succisa*). Devil's-bit. Blue-tops.

Stems erect, 1—2 ft., branched towards the summit. Leaves in opposite pairs, the lower oblong or inversely egg-shaped, with smooth edges, the upper narrower, often

toothed. Flower-heads almost globular, about 1 in. diameter, bluish-purple. Frequent. P. 7—10.

**SCABIOUS, Field** (*Scabiosa arvensis*). See Section I.

**SCABIOUS, Sheep's** (*Jasione montana*). Sheep's-bit.

Stems branched from below,  $\frac{1}{2}$ —1 ft. high, often less on very dry ground. Leaves about  $\frac{3}{4}$  in. long, inversely



Fig. 20.

**SMALL SCABIOUS.**

(*Scabiosa Columbaria*.)

(About  $\frac{1}{2}$  nat. size.)

egg-shaped to oblong, the lower stalked, the upper narrower, wavy, stalkless. Flowers very tiny, in terminal roundish heads on slender naked stalks, pale purplish-blue. Frequent on light ground. A. or B. 6—9.

**SCABIOUS, Small** (*Scabiosa Columbaria*). (Fig. 20.)

Stem erect, 1—2 ft., usually branched above, covered with hairs. Leaves opposite, the lower ones narrow,

stalked, often uncut, the upper usually deeply cut into narrow segments. Flower-heads 1—1½ ins. diameter, lilac or pale bluish-purple. Common in dry pastures. P. 7—9.

**CONTROL MEASURES:** The four species of Scabious should be regularly cut to prevent seeding; and the land manured well, chiefly with phosphates and potash.

**SEDGE** (*Carex* spp.).

The Sedges are a large race of grass-like plants with long narrow leaves, usually stiff, solid stems, and minute brownish flowers, generally in heads or clusters. They differ from the Grasses mainly in their solid (instead of hollow) stems, which are usually angular (often triangular, but practically never round as in the Grasses), and without the swollen joints so conspicuous in most members of the Grass Family. The leaves of the Sedges are mainly rough and harsh, and are of little or no use as pasturage plants.

**CONTROL MEASURES:** Draining (where necessary), and persistent cutting, followed by the application of Lime. Manure well to encourage the grasses.

**NOTES:** Largely used for fodder, litter, thatching and fuel in the Fens. The Gooseberry Cluster Cup fungus is found on Sedges.

**SEDGE, Cotton** (*Eriophorum angustifolium*). Cotton Grass.

A grass-like plant, with smooth stems ½—1½ ft. high, and roughly triangular in shape. Leaves very narrow, with rough edges, chiefly springing from root. Most conspicuous in seeding stage, when the greenish flower-spikes, several on each stem, develop long tufts of silvery hairs, which they retain for a long period. Frequent in wet places. P. 5—6.

**CONTROL MEASURES:** As previous species.

**SEDGE, Hare's-tail Cotton** (*Eriophorum vaginatum*). Cotton Grass.

A similar plant to Cotton Sedge (above), but differing



mainly in its solitary, instead of clustered, feathery white tufts, *i.e.*, only one, instead of several spikes, grows on each stem. Frequent. P. 4—5.

CONTROL MEASURES : See Sedge.

**SELF-HEAL, Common** (*Prunella vulgaris*). See Section I.

CONTROL MEASURES : Give a good dressing of Lime, and apply Basic Slag or Superphosphate, at the rate of 6 to 8 cwt. per acre. Grazing with sheep reduces it. Sowing a little white clover seed on infested pastures is recommended.

**SILVERWEED, Common** (*Potentilla anserina*). See Section I.

CONTROL MEASURES : Manure freely with phosphatic manures. Give 6 to 8 cwt. of Basic Slag or Superphosphate per acre.

**SORREL, Common** (*Rumex Acetosa*). See Section I.

CONTROL MEASURES : Cut down regularly before seeding. Give heavy dressings of lime, followed by Basic Slag and Kainit.

NOTES : Has been suspected of poisonous properties, but experiments have not confirmed this.

**SORREL, Sheep's** (*Rumex Acetosella*). See Section I.

CONTROL MEASURES : As previous species.

NOTES : Has been found injurious to horses and sheep, but is rarely fatal.

**SPEARWORT, Lesser** (*Ranunculus Flammula*). Narrow-leaved Buttercup.

Stems more or less erect, often partly prostrate and creeping, branched,  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft. Leaves narrow-lance-shaped and stalkless above, broader and with stalks below. Flowers  $\frac{1}{2}$  in. diameter, Buttercup-like, petals 5, yellow. Common in wet ground. P. 6—8.

**CONTROL MEASURES :** As Buttercups. Keep ditches cleaned out and improve drainage of wet land.

**NOTES :** One of the most poisonous species of *Ranunculus*. (See Buttercup, also Section III.)

**SPEEDWELL, Germander** (*Veronica Chamædrys*).

Birds'eyes. Cats'eyes. Germander.

Stems prostrate at the base, erect above,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft. long, with 2 opposite rows of hairs, which alternate between each joint and the next. Leaves about 1 in., in opposite pairs, egg-shaped, notched, stalkless. Flowers in upright clusters, 2—4 ins. long, corolla up to  $\frac{1}{2}$  in. diameter, bright blue or lilac. Common. P. 5—7.

**CONTROL MEASURES :** Seeds are liable to be introduced in Clover and Grass seed. Graze closely and improve herbage by suitable manuring.

**TEAZLE, Wild** (*Dipsacus sylvestris*).

Stem stout, 3—5 ft., prickly. Leaves opposite, lance-shaped, often joined at the bases, middle rib with prickles. Flower-heads egg-shaped, 2—3 ins. long, very bristly, corolla tubular, with 4 lobes, lilac or purplish. Frequent. B. 8—9.

**CONTROL MEASURES :** Regular cutting to prevent seeding.

**THISTLE, Carline** (*Carlina vulgaris*).

Stem erect, about 1 ft. high, often branched above. Leaves lance-shaped, very spinous, usually woolly beneath, upper ones clasping the stem. Flower-heads about 1 in. diameter, purplish in the centre, surrounded by a ring of straw-like, persistent bracts. Frequent in dry pastures. B. 6—10.

**THISTLE, Creeping** (*Cnicus arvensis*). See Section I.

**THISTLE, Dwarf** (*Cnicus acaulis*). Ground Thistle. Stemless Thistle.

Usually stemless, with the large crimson-purple flower-head seated in the centre of the rosette of deeply cut spinous

leaves. Occasionally developing a stem  $\frac{1}{2}$ —1 ft. in height. Frequent in dry chalky pastures. P. 7—9.

**THISTLE, Marsh** (*Cnicus palustris*).

Stem 3—10 ft., our tallest native Thistle, stout, hollow, branched towards the summit, and very spinous. Leaves deeply cut, spinous, their bases running partly down the stem, hairy. Flower-heads in clusters, head about  $\frac{1}{2}$  in. diameter, purplish. Common in marshy ground. B. 6—9.



Fig. 21.

**MUSK THISTLE.**

(*Cardus nutans*.)

(About  $\frac{1}{2}$  nat. size.)

**THISTLE, Musk** (*Carduus nutans*). See Section I. (Fig. 21.)

**THISTLE, Scotch** (*Onopordon Acanthium*). See Section I.

**THISTLE, Spear** (*Cnicus lanceolatus*). See Section I.

**THISTLE, Welled** (*Carduus crispus*). See Section I.

**CONTROL MEASURES:** Persistent cutting is the chief method of destroying all thistles. In the case of the stemless Thistle spudding serves the same purpose. The

Creeping Thistle must be cut frequently from late May to the end of July. It is said to be eradicated in three years by this treatment.

Other Thistles (biennials) may be dealt with by two or more cuttings before the flowering period, and by spudding out the young plants in the Spring.

Liming and the application of phosphates reduce Thistles.

NOTES : See Section I. for arable land and various other notes.



Fig. 22.

**TORMENTIL.**

(*Potentilla Tormentilla*.)

(About  $\frac{2}{3}$  nat. size.)

**TORMENTIL** (*Potentilla Tormentilla*). (Fig. 22.)

Stem slender,  $\frac{1}{2}$ — $\frac{3}{4}$  ft., branched, more or less prostrate, sometimes rooting. Leaves of 3 leaflets, leaflets oblong, deeply notched. Flowers on slender stalks,  $\frac{1}{2}$  in. diameter, petals 4, inversely heart-shaped, yellow. Frequent in dry pastures. P. 6—9.

**CONTROL MEASURES :** Apply phosphatic manures, and lime if required, to encourage grasses and clovers which will crowd out the weed.

**NOTES :** Has been used in medicine; also for tanning

in the Orkney Isles. A red dye is obtainable from the roots.

**TREFOIL, Bird's-foot** (*Lotus corniculatus*). Tom Thumbs.  
Lady's Fingers. (Fig. 23.)

Stems  $\frac{1}{4}$ —1 ft., usually tufted below, more or less prostrate. Leaves pinnate, leaflets usually 5, about  $\frac{1}{2}$  in. long, roughly egg-shaped. Flowers in heads of 5—10, pea-shaped, yellow. Common. P. 6—9.

**CONTROL MEASURES :** There is no method of reducing it,



Fig. 23.

**BIRD'S-FOOT TREFOIL.**

(*Lotus corniculatus*.)

(About  $\frac{1}{2}$  nat. size.)

except close grazing. Manures which stimulate grasses and clovers encourage this plant also.

**NOTES :** Can hardly be regarded as a weed in pastures, for it is readily eaten by farm animals and has good feeding value. The seed is often included in grass mixtures for permanent pasture.

**TREFOIL, Hop** (*Trifolium procumbens*). Hop Clover.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., erect, or partly prostrate, branched, finely hairy. Leaves of 3 leaflets, each roughly inversely egg-shaped, toothed. Flowers in dense globular heads, about  $\frac{1}{4}$  to  $\frac{1}{2}$  in. diameter, each head containing 30—40

minute pea-shaped flowers. Seeding heads hop-like, membranous. Common. A. 6—8.

CONTROL MEASURES : Graze off or cut before seeding, and encourage other herbage by manuring.

NOTES : Although eaten by stock, this plant is practically valueless in grass land.

**WILLOWHERB, Great Hairy** (*Epilobium hirsutum*).  
Codlins-and-Cream.

Stem erect, much branched, about 4 ft. high. Leaves 3—5 ins. long, in opposite pairs, egg-shaped to lance-shaped, partly clasping the stem. Flowers in leafy clusters, numerous, about  $\frac{1}{2}$ — $\frac{3}{4}$  in. diameter, petals 4, rosy-purple. Underground stems creeping extensively. Common in wet ground. P. 7—8.

CONTROL MEASURES : Repeated cutting throughout the Summer. Judicious manuring to encourage useful plants, and perhaps liming. Draining where possible.

NOTES : The Hop and Strawberry mildew also attacks Willow Herbs.

**WILLOWHERB, Small-flowered** (*Epilobium parviflorum*).

Stem erect, 1—3 ft., branched towards the summit. Leaves lance-shaped, stalkless, alternate, downy. Flowers numerous,  $\frac{1}{4}$  in. diameter or more, petals 4, rosy-purple. Runner-like stems creeping extensively. Common in damp ground. P. 7—8.

CONTROL MEASURES : As previous species.

**WOODRUSH, Field** (*Luzula campestris*). Chimney Sweeps. Black-headed Grass.

Stems erect,  $\frac{1}{4}$ — $\frac{3}{4}$  ft., usually slender. Leaves dark green, grass-like, hairy along the edges. Flowers minute, brownish, clustered. Differing from the common Rushes mainly in its flat, grass-like leaves. Rootstock creeping. Common in dry meadows and pastures. P. 4—6.



**CONTROL MEASURES :** May be reduced by good manurial treatment to encourage useful herbage.

**YARROW, Common** (*Achillea Millefolium*). Milfoil.  
Nosebleed. Sneezewort.

Stems erect, sometimes prostrate at the base, 1—1½ ft. high, furrowed, generally unbranched. Leaves 2—6 ins. long, very finely cut into narrow segments. Flower-heads densely clustered, each head about ¼ in. diameter or less, egg-shaped, outer florets numerous, white, often tinged reddish or purple. A common weed of pastures. P. 5—9.

**CONTROL MEASURES :** Pastures should be closely grazed with sheep in Spring and early Summer. In pastures the application of nitrogenous manures will reduce it.

**NOTES :** Sheep eat this plant when young, and it is sometimes sown in grass mixtures, but this is a mistake, as it spreads rapidly. The woody stems are objectionable in hay. Yarrow has been much used medicinally, and possesses astringent properties. The Hop and Strawberry mildew attacks Yarrow.

**YELLOW RATTLE, Common** (*Rhinanthus Crista-galli*).

Stem erect, ½—1½ ft., sometimes unbranched, sometimes with opposite branches. Leaves 1—2 ins. long, lance-shaped, notched, wrinkled, in opposite pairs. Flowers in spike-like clusters, corolla 2-lipped, ½—1 in. long, yellow. Semi-parasitic. Common in moist pastures. A. 5—7.

**CONTROL MEASURES :** Close grazing of pastures, especially with sheep early in the year, followed later by cutting the remaining Yellow Rattle before it seeds. Mow meadows much earlier than usual for two years. Manure well with a complete fertilizer; or give Basic Slag, followed in the Spring with Kainit and Sulphate of 'Ammonia. Yellow Rattle has been exterminated by salt at the rate of 6 cwt. per acre, applied in 'dry weather during April.

**NOTES :** A poisonous principle is said to exist in the seeds, which may injure animals that eat the mature plant continuously.

### SECTION III.

WEEDS OF LAWNS, GOLF GREENS, GARDEN PATHS, ETC.

**BEDSTRAW, Yellow** (*Galium verum*). See Section II.

CONTROL MEASURES : Treat with Lawn Sand, after close mowing ; or remove patches of turf and replace with fresh.

**BINDWEED, Common** (*Convolvulus arvensis*). See Sections I and II.

CONTROL MEASURES : Persistent hand pulling or cutting of the shoots as they appear. Removal of the roots is impossible on a lawn, but they are exhausted by the above method.

**BUTTERCUPS, Various** (*Ranunculus* spp.). See Section II.

CONTROL MEASURES : Treat with Lawn Sand several times and pierce the roots. (See Dandelion.) Cut out affected parts and replace with fresh turf.

**CAT'S-EAR, Long-rooted** (*Hypochaeris radicata*). See Section II.

CONTROL MEASURES : As Dandelion.

**CELANDINE, Lesser** (*Ranunculus Ficaria*). See Section II.

CONTROL MEASURES : As Buttercups.

**CHICKWEED, Mouse-ear** (*Cerastium vulgatum*). See Sections I and II.

CONTROL MEASURES : Cut foliage closely, then dress patches with Lawn Sand. Sow grass seed on the bare places that result.

**CLOVER, Dutch** (*Trifolium repens*). White Clover.  
Dutch Honeysuckle.

Stems  $\frac{1}{4}$ — $1\frac{1}{2}$  ft., prostrate, creeping, free from hairs. Leaves of 3 leaflets, leaflets usually brownish beneath, inversely heart-shaped,  $\frac{1}{4}$ — $\frac{3}{4}$  in. long, notched, often with a dark spot near the base, bordered by a whitish crescent-shaped line. Flowers minute, pea-shaped, white or pinkish, growing in globular heads about 1 in. diameter, on stalks





PLATE VII.

1. Common Daisy, showing creeping habit frequent on lawns.
2. Creeping Buttercup, showing runners.

from 3—6 ins. long, fragrant, turning brown after pollination. Abundant. P. 5—10.

**CONTROL MEASURES :** Avoid the use of Basic Slag and Superphosphate, and apply nitrogenous manures. Small patches may be killed with Lawn Seed, and resown with grass seed.

**DAISY, Common** (*Bellis perennis*). See Section II.

**CONTROL MEASURES :** Apply Lawn Sand in the Spring, seeing that the leaves of each plant are well covered; it is useless to spread it broadcast. The plants may also be removed by hand with a knife, spud, or "daisy grubber."

**DANDELION, Common** (*Taraxacum vulgare*). See Sections I and II.

**CONTROL MEASURES :** Cover the crown of each plant with Lawn Sand, and then pierce with a sharp instrument. Several applications may be necessary. A special instrument (the Wikeham Weed Eradicator) is obtainable for injecting poisonous weed killer into the crowns of Dandelions and other plants. This is a very effective method. Tools are also obtainable which will extract the roots more or less completely, but they leave numerous round holes in the lawn which require filling in.

**DOCKS, Various** (*Rumex* spp.). See Sections I and II.

**CONTROL MEASURES :** Kill with the "Wikeham Eradicator," or remove roots with a weed extractor (see Dandelion).

**FUNGI, Various.**

Fungi are principally troublesome on lawns and greens owing to the habit of some of them of growing in circles known as *Fairy Rings*. A typical ring of this kind usually has not only a circle of dark green luxuriant growth, but another circle of almost bare ground, where the great majority of the grasses have been killed by the growth of the Fungi.

The dark green circle is nearly always on the inner side, and its presence is due mainly to the manurial effect of the

decaying plants killed by the Fungi in former years. The lush growth is seldom made up of the finer grasses of the lawn, however, but practically always of plants of rank growth, which have colonised the circle of fallow ground left by the Fungi.

Our knowledge of the plants which cause *Fairy Rings* is very incomplete, but such plants are certainly not invariably Fungi. Several of our flowering plants have been proved to form similar circles. Probably, however, the principal cause of the trouble is the Fungus known as the Fairy Ring Champignon (*Marasmius oreades*) which is a small mushroom-like plant with the following characters :

Stem  $1\frac{1}{2}$ — $2\frac{1}{2}$  ins. high, seldom exceeding  $\frac{1}{8}$  in. diameter, solid, stiff, straight, distinctly tough and fibrous, whitish, more or less clothed with soft down, particularly towards the base. Cap 1— $2\frac{1}{2}$  ins. across, at first brownish-buff, usually turning paler as it dries, markedly convex when young, becoming nearly flat later. Gills creamy-white, separate, some distance apart, alternately varying in length. Odour pleasant. Edible. Shrivels in times of drought, but quickly revives when moistened. Common from May to October.

Many other Fungi grow in *Fairy Rings*, and probably some (e.g., *Paxillus giganteus*) are directly concerned in their cause, but several species only follow in the wake of the harmful kinds, and die out naturally when the true cause is removed.

**CONTROL MEASURES :** Remove "Toadstools" by hand whenever they appear, and dress ground with lime, 4 ozs. per square yard. Kainit is also effective, as also is Lawn Sand if used in sufficient quantity, and watering with a solution of Sulphate of Iron ( $\frac{1}{2}$  lb. to a gallon) will generally destroy Fungi.

*Fairy Rings* should be treated with powdered Iron Sulphate, at the rate of a pound to ten square yards. It is important to dress the ground about half a yard outside the visible ring, and to apply the treatment in dry weather. Lime is also sometimes successful. If this treatment fails,



the only plan is to cut out the turf, dust the hole with quicklime, fill up with soil and sow fresh seed.

**GRASS, Cocksfoot** (*Dactylis glomerata*).

Stems erect, 1½—3 ft., partly prostrate and creeping below, free from hairs. Leaves flat, narrow, deep green, rough and harsh. Flower-clusters branched, spreading with age, flowers in dense tufts, often tinged purple. Common. P. 6—7.

**CONTROL MEASURES :** Remove clumps bodily with a weed fork, or cut out the turf and replace with fresh.

**GRASS, Common Bent** (*Agrostis vulgaris*). See Sections I. and II.

**CONTROL MEASURES :** The flowering stems, being usually missed by the mowing machine, should be cut with shears or a scythe. Dig out the roots in September and sow seed on the bare patches.

**GRASS, Couch** (*Agropyron repens*). See Sections I. and II.

**CONTROL MEASURES :** Keep grass closely cut, and apply bone meal in the autumn, at the rate of 4 ozs. per square yard. Clumps of coarse grass may be dug out and the patches resown.

**GRASS, Meadow Soft** (*Holcus lanatus*). See Section II.

**CONTROL MEASURES :** As Cocksfoot Grass.

**HAWKBIT, Hairy** (*Leontodon hirtus*). Lesser Hawkbit. Thrincia.

Stemless. Leaves 3—5 ins. long, stalked, oblong to lance-shaped, rough, sometimes toothed. Flower-stalks 4—7 ins., numerous, hairy, heads ½—¾ in. diameter, florets all strap-shaped as in Dandelion, yellow. Common on gravelly ground. B. or P. 6—9.

**CONTROL MEASURES :** Cut off the crowns and apply Lawn Sand, or Weed Killer, to the root stump.

**HAWKWEED, Mouse-ear** (*Hieracium Pilosella*). See Section II.

**CONTROL MEASURES :** As Hawkbit.

**KNOTGRASS, Common** (*Polygonum aviculare*). See Section I.

**CONTROL MEASURES:** Spud out or remove by hand. Occurs only on newly sown lawns.

**LICHENS, Various.**

All Lichens are dual plants, composed of a minute Fungus and Algæ living in close relationship one with the other. They differ from Fungi mainly in the fact that they contain the green colouring matter of plants (chloro-



Fig. 24.

**GROUND LICHEN.**

(*Peltigera canina*.)

(About  $\frac{2}{3}$  nat. size.)

phyll), though this is often entirely masked by other and brighter tints.

Lichens grow mainly upon the barks of trees and such like places, and may do indirect harm by harbouring injurious pests, but few of them cause any trouble as "weeds." One species, however, viz., the Ground Lichen (*Peltigera canina*) (Fig. 24), often erroneously called the Ground Liverwort, is common on Lawns, and does considerable damage to the grass if left unchecked.

The Ground Lichen consists mainly of large, irregular, rounded lobes of thin membrane, 2—4 ins. long, and 1—2 ins. broad, lying horizontally on the earth. The upper surface is somewhat woolly, of a greenish-brown when moist, but becoming grey when dry. The under surface is woolly, veined, and whitish, and bears root-like threads which attach the plant, though only very lightly, to the

material on which it grows. The fruiting portion of this Lichen consists of deep brown tubercle-like growths around the margins of the lobes. The plant is very common, and may be found at all seasons of the year.

**CONTROL MEASURES :** Rake out as much as possible, and then give a dressing of fine freshly-slaked lime. Two or three weeks later apply a good lawn fertiliser. Soot is also beneficial in keeping down Lichen. Bad drainage should be remedied if possible.

**MEDICK, Black** (*Medicago lupulina*). See Sections I. and II.

**CONTROL MEASURES :** Best pulled up by hand. If not, treat as Clover.

**MOSSES, Various.** See Section II.

**CONTROL MEASURES :** Rake out as much as possible, then give a dressing of lime in the Autumn. In the Spring apply a good complete fertiliser, and sow seed where necessary. Repeat this treatment every two years on lawns inclined to be mossy.

A dressing of Sulphate of Iron will kill moss, but makes the lawn black and unsightly for a time. It should be followed by liming, after the dead moss has been raked out. Moss usually indicates sourness and poverty of the soil, and bad drainage.

**PEARLWORT, Common** (*Sagina procumbens*). See Section I.

**CONTROL MEASURES :** Dress with Lawn Sand, and reseed the resulting bare patches; or cut out and replace with fresh turf. Apply a good lawn fertiliser every two years.

**PLANTAIN, Buck's-horn** (*Plantago Coronopus*). Harts-horn. Starweed. Star Plantain.

Stemless. Leaves narrow, hairy, 1—10 ins. long, varying much in size and shape, usually very deeply cut into narrow segments, and lying flat upon the ground in a rosette. Flower-stalks often nearly horizontal below, then erect, 2—9 ins. high, flower-spikes  $\frac{1}{2}$ —4 ins., each sur-

mounting a stalk, flowers minute, greenish, with yellow stamens. Common on sandy soils, and near the sea. A. or B. 6—8.

**CONTROL MEASURES :** Injecting Weed Killer with the Wikeham Eradicator, removing with a weed extractor, or cutting of the crowns and applying Lawn Sand or salt to



Fig. 25.

**GREATER PLANTAIN.**

(*Plantago major*.)

(About  $\frac{1}{2}$  nat. size.)

the root stump. Lawns and Golf Greens on poor sandy soil near the coast should be enriched with organic fertilisers.

**PLANTAIN, Greater** (*Plantago major*). See Sections I. and II. (Fig. 25.)

**CONTROL MEASURES :** Cut out with a knife, or treat as recommended for Dandelion.

**PLANTAIN, Hoary** (*Plantago media*). See Sections I. and II.

CONTROL MEASURES : As previous species.

**PLANTAIN, Ribwort** (*Plantago lanceolata*). See Sections I. and II.

CONTROL MEASURES : As Greater Plantain.

**PLANTAIN, Sea** (*Plantago maritima*).

Resembling the Buck's-horn Plantain (above) in general habit, but differing in its very narrow, undivided, fleshy leaves, and its perennial duration. Common on the coast and in neighbouring regions. 6—9.

CONTROL MEASURES : As Buck's-horn Plantain.

**RUSHES** (*Juncus* spp.). See Section II.

CONTROL MEASURES : Regular mowing, treating with lime and good manuring will keep them down ; but draining is necessary to eradicate them.

**SELF-HEAL, Common** (*Prunella vulgaris*). See Sections I. and II.

CONTROL MEASURES : Spudding or cutting out by hand, or may be killed by several dressings of Lawn Sand.

**SHEPHERD'S PURSE** (*Capsella Bursa-pastoris*). See Section I.

CONTROL MEASURES : Treat with Lawn Sand, or in young grass pull up by hand. Not found on established lawns, but sometimes troublesome on those newly sown.

**SORREL, Common** (*Rumex Acetosa*). See Section I.

CONTROL MEASURES : Remove by spudding. Lime will discourage it, and the grass should be stimulated by fertilisers.

**THISTLES** (*Cnicus* spp.). See Section II.

CONTROL MEASURES : Spud out when young and keep grass closely mown.



**THRIFT, Common** (*Armeria vulgaris*). Sea Gilliflower.  
Sea Pink.

Stemless. Leaves 2—5 ins. long, all springing from root, very narrow, grass-like. Flower-stalks 3—10 ins., hairy, each surmounted by a rounded, close head ( $\frac{1}{2}$ —1 in. diameter) of small flowers, petals 5, rose-pink, occasionally white. Frequent near the sea. P. 5—10.

CONTROL MEASURES : As Buck's-horn Plantain.

**TREFOIL, Bird's-foot** (*Lotus corniculatus*). See Section II. (Fig. 23.)

CONTROL MEASURES : Hand pulling, or cutting off the plants at ground level and applying Lawn Sand to the roots.

**TREFOIL, Hop** (*Trifolium procumbens*). Hop Clover.  
See Section II.

CONTROL MEASURES : As previous species.

**TREFOIL, Yellow** (*Trifolium dubium*). Suckling Clover.

Stems  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., slender, of straggling habit, often mainly prostrate. Leaves of 3 leaflets, each inversely egg-shaped, with toothed edges. Flowers in rounded clusters (about  $\frac{1}{4}$  in. diameter) consisting of from 3 or 4 up to 20 minute, yellow, pea-shaped flowers. Common. A. 6—8.

CONTROL MEASURES : As Clover.

**WOODRUSH, Field** (*Luzula campestris*). See Section II.

CONTROL MEASURES : Remove by hand as much as possible, and give one or two applications of a good complete fertiliser annually.

**YARROW, Common** (*Achillea Millefolium*). See Section II.

CONTROL MEASURES : Frequent dressings of Lawn Sand will kill it in time, or the patches of turf may be cut out and replaced with fresh.



## WEEDS ON PATHS, DRIVES AND YARDS.

In addition to the primitive methods of hoeing and hand weeding, there are several preparations by which weeds may be destroyed on paths, drives, roadways, yards, etc., which it is desirable to keep free from any vegetable growth.

The most efficient of these preparations is arsenical Weed Killer, which consists of sodium arsenite, and is obtainable either in powder form or as a concentrated solution. It should be used at a strength *not less* than that recommended by the makers, and applied with a watering can when the ground is moist, but not during wet weather. If rain falls within twenty-four hours, a second application should be given. The objections to this Weed Killer are that animals are liable to be poisoned if they eat weeds that have been treated, and fowls and other birds may be killed by eating poisoned worms.

The so-called Non-poisonous Weed Killers are carbolic or tar-acid preparations which are harmless to animals after dilution, but they are not quite so effective in their weed destroying properties.

Weed Killer should never be applied close to any living tree or hedge, and unless a special type of watering can is used, the edges of lawn and box edging should be protected by boards.

Salt will kill weeds if sprinkled on them in sufficient quantity, and has the advantage of being non-poisonous.

To keep any bare ground free from weeds and moss it is necessary to apply Weed Killer regularly at least once a year, except to parts subjected to hard wear.

## SECTION IV.

### WEEDS OF PONDS, LAKES, WATER COURSES, ETC.

The methods available for keeping down aquatic plants are so few that it is unnecessary to refer to them in detail under each species, except where special measures are applicable. The control measures are therefore divided into two systems, according to whether the plants are entirely aquatic and mainly submerged, or only semi-aquatic and growing either on the banks or with their roots in shallow water. These control measures will be found at the end of the chapter, and under each plant is given a reference to the system of control.

Water weeds have a certain economic value, which should not be overlooked, and their removal must be carried out judiciously. Upon these plants the animal life of the pond, lake or river is dependent, either directly or indirectly. The plants provide food and shelter for multitudes of insects, snails, and other small creatures, which in their turn are fed upon by fish and waterfowl, both of which also eat the plants to a certain extent.

In stagnant water, submerged plants are necessary for its proper aeration.

#### **ALGÆ, Various. Blanket Weed. Scum. Slime.**

Algæ are flowerless plants, mainly of very simple structure. Many are microscopic in size, but those which cause the principal trouble as "weeds" of ponds, moats and water-courses are usually seen in the form of multitudinous thread-like, greenish growths, without any differentiation into leaves, stems, roots, etc. They are always wholly submerged, and reproduce rapidly in the warmer months by vegetative methods. Spores, too, are often produced, and may serve to tide the Algæ over trying periods of cold or drought.

**CONTROL MEASURES :** Floating Algæ may be destroyed with a solution of Copper Sulphate ( $\frac{1}{2}$  lb. in each 10 gallons

of water) sprayed evenly over the surface. Bordeaux Mixture, at half usual strength, is also effective. Water Lilies, and all plants with floating leaves are injured by spraying.

For submerged Algæ, Copper Sulphate may be put in a coarse sack and dragged backwards and forwards from the bank, or towed up and down in a boat, until it is all dissolved. To be safe for water birds and for drinking purposes by man or animals, the Copper Sulphate must not exceed one part in a million parts of water by weight (*i.e.*, one pound in a hundred thousand gallons).

The contents of a pond may be estimated by roughly calculating the cubic capacity in feet (length, by breadth, by average depth) and multiplying the result by  $6\frac{1}{4}$ . This gives the number of gallons, and a division by 100,000 gives the pounds of Copper Sulphate required. A second application should be made a week or two later.

Little is known as to the effect of Copper Sulphate upon fish, and every caution should be used when fish are present. Perch and Eels are said to be unaffected by the above strength, but it may be injurious to other species. It is best to experiment with a few fish in a bucket of water, in which a few grains of Copper Sulphate have been dissolved.

### ARROWHEAD (*Sagittaria sagittifolia*).

Stemless. Leaves erect, 3—6 ins. long, markedly arrow-shaped, pointed, all springing from the root, long-stalked. Flower-stalk  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., bearing from 3—5 whorls of flowers, each whorl consisting of usually 3 flowers  $\frac{1}{2}$  in. in diameter, petals 3, roundish, spreading. Frequent. P. 7—9.

### CONTROL MEASURES : System I.

### BROOKLIME (*Veronica Beccabunga*). Speedwell.

Stems erect or partly prostrate and rooting, 1—2 ft. long, hollow, spreading. Leaves in opposite pairs, oblong or inversely egg-shaped, 1—2 ins long, edges toothed. Flowers

in opposite clusters, minute, corolla 4-lobed, usually bright blue, sometimes pink. Common. P. 5—9.

CONTROL MEASURES : System II.

**BULRUSH** (*Scirpus lacustris*). Clubrush.

Not a true Rush, but a Sedge. Stems variable, often 6 ft. high and  $\frac{1}{2}$  in. diameter, smooth, leafless, with a spongy interior. Leaves none, or very few, grass-like, variable. Flower-spikes brownish, dense, rush-like. Frequent. P. 7—8.

CONTROL MEASURES : System II.

**BUR-REED, Branched** (*Sparganium ramosum*). Burweed.

Stems erect, 2—3 ft., branched. Leaves 2—4 ft., erect, triangular at the base, sword-like, about 1 in. across. Flowers in globular heads, male heads brownish, about  $\frac{1}{2}$  in. diameter, soon falling, female up to 1 in. diameter, green, persistent. Root-stock creeping extensively. Common. P. 6—8.

CONTROL MEASURES : System II.

**BUR-REED, Unbranched** (*Sparganium simplex*). Burweed.

Rather smaller than the Branched Bur-Reed (above), and differing principally in its unbranched main flowering stem. Frequent. P. 6—8.

CONTROL MEASURES : System II.

**CROWFOOT, Celery-leaved** (*Ranunculus sceleratus*). Celery-leaved Buttercup.

Stem erect,  $\frac{1}{2}$ —1 $\frac{1}{2}$  ft., much branched, hollow. Lower leaves deeply cut, very variable in shape, upper narrower, less divided. Flowers about  $\frac{1}{4}$  in. diameter, petals 5, pale yellow. Fruiting heads lengthening, oblong. Frequent. A. 5—9.

CONTROL MEASURES : System II.

NOTES : Very poisonous, perhaps the most poisonous species of *Ranunculus*. Cattle have frequently been killed by it, through inflammation of the digestive organs.

**CROWFOOT, Water** (*Ranunculus aquatilis*). Water Buttercup. White Buttercup. Water-lilies.

Very variable. Stems usually submerged, branched. Leaves usually of two kinds, those submerged being cut into fine, hairlike segments, those floating on the surface usually rounded or lobed. Flowers on separate stalks rising just above the water,  $\frac{1}{2}$ —1 in. diameter, petals 5, white. Common. P. 5—6.

CONTROL MEASURES : System I.

NOTES : A nutritious plant, without poisonous properties. It has often been used as food for cattle, horses and pigs, which are said to thrive on the diet.

**DOCK, Great Water** (*Rumex Hydrolapathum*). Docken.

Resembling in general habit the Docks already described in Section I., but stem often 5—6 ft. high, and leaves up to 2 ft. long, broad and heart-shaped. Common in wet places. P. 7—8.

CONTROL MEASURES : System II.

**DROPWORT, Water** (*Enanthe crocata*). Hemlock Water Dropwort.

Stem erect, 2—4 ft., branched, hollow, with furrows. Leaves large, deeply cut into wedge-shaped segments. Flowers in umbels with long rays, petals 5, white. Frequent. P. 7—8.

CONTROL MEASURES : System II.

NOTES : Perhaps the most poisonous of British plants, and frequently causes deaths among all farm animals. All parts are poisonous, whether green or dried.



**DUCKWEED, Common** (*Lemna minor*). (Fig. 26.)

A minute floating plant, consisting of an inversely egg-shaped scale-like leaf or frond, often less than  $\frac{1}{4}$  in. diameter, and a single root beneath which is, as a rule, suspended in the water. Flowers very minute, seldom seen. Gregarious plants, often covering whole ponds with a sheet of green, and multiplying rapidly by vegetative methods. A. 6—7.

**DUCKWEED, Great** (*Lemna polyrrhiza*).

Similar in habit to Common Duckweed (above), but differing in its larger frond, often purplish on the under



Fig. 26.

COMMON

DUCKWEED.

(*Lemna minor*.)

(About nat. size.)



Fig. 27.

IVY-LEAVED

DUCKWEED.

(*Lemna trisulca*.)

(About nat. size.)

side, and its many roots. It does not produce flowers in this country. A.

**DUCKWEED, Ivy-leaved** (*Lemna trisulca*). (Fig. 27.)

Also similar to the Common Duckweed (above), but differing in its branching, narrower fronds, giving an ivy-leaf appearance, and often  $\frac{1}{2}$ — $\frac{3}{4}$  in. long. Common. A. 6—7.

**CONTROL MEASURES:** Spraying with Copper Sulphate solution or Bordeaux Mixture will destroy all floating Duckweed. Treat as recommended for Algae. Ducks help to keep it down.



NOTES : These plants and the animal life they harbour are useful as food for ducks. The weed has also been collected and fed to poultry and pigs, after cooking.

**FIGWORT, Water** (*Scrophularia aquatica*).

Stems erect, branched, 2—4 ft. high, squarish in shape, stout. Leaves heart-shaped, mainly in opposite pairs, 3—6 ins. long, with their stalks running into the main stem. Flowers in loose, forked, clusters, corolla 2-lipped,  $\frac{1}{4}$  in. long, greenish-brown. Rootstock creeping extensively. Common. P. 7—10.

CONTROL MEASURES : System II.

NOTES : Sheep are said to have been injured by this plant, but apparently not fatally.

**GRASS, Floating Foxtail** (*Alopecurus geniculatus*). See Section II.

CONTROL MEASURES : Ponds choked by this weed should be drained and well cleared out. Then give one or two dressings of salt to thoroughly kill the grass while the pond is empty.

**HEMP-AGRIMONY** (*Eupatorium cannabinum*).

Stem 2—3 ft. or more, usually slightly branched. Leaves in opposite pairs, deeply divided. Flower-heads individually small, but massed into dense clusters become very conspicuous, pale reddish-purple in colour. Common. P. 7—9.

CONTROL MEASURES : System II.

NOTES : Used medicinally for blood disorders.

**HORSETAIL, Bog** (*Equisetum limosum*). Mud Horsetail. Paddock Pipes. Joints.

Resembling the Field Horsetail (see Section I.) in general form and habit, but differing in its barren and fruiting

stems being almost alike, with few or no branches. Rootstock creeping extensively. Common in wet places. P. 6—7.

CONTROL MEASURES : See Section II.

**HORSETAIL, Great Water** (*Equisetum maximum*). Large Horsetail. Joints. Horse Pipes.

Distinguished from our other Horsetails by its large size, often reaching 5—6 ft. in height and  $\frac{1}{2}$  in. in diameter. The fruiting spikes appear in April, surmounted by the cones, the well known branched barren ones later. Large creeping rootstock. Frequent. P.

CONTROL MEASURES : See Section II.

NOTES : Both these species of Horsetails are poisonous, but are usually avoided by animals. Cattle, however, are sometimes poisoned.

**IRIS, Yellow** (*Iris Pseudacorus*). Flag.

Flower-stalks 2—4 ft. high, branched. Leaves similar in length, sword-like, about  $\frac{3}{4}$  in. broad. Flowers 3 ins. diameter, usually yellow, and resembling in shape the common Irises of the garden. Rootstock creeping extensively. (Fig. 3.) Frequent. P. 5—8.

CONTROL MEASURES : System II.

NOTES : Has been used medicinally as an astringent lotion, and also has purgative and emetic properties. It is said to be injurious to cattle.

**LOOSESTRIFE, Purple** (*Lythrum Salicaria*).

Stem erect, 3—5 ft., branched, more or less square. Leaves 3—4 ins. long, lance-shaped, in opposite pairs, or in whorls of 3 or 4. Flowers in terminal spike-like clusters, handsome, often  $\frac{3}{4}$  in. diameter, petals narrow, wrinkled,

reddish purple. Rootstock creeping extensively. Common. P. 7—9.

CONTROL MEASURES : System II.

**MARESTAIL** (*Hippuris vulgaris*). Horsetail.

Stem erect,  $\frac{1}{2}$ — $1\frac{1}{2}$  ft., unbranched, with many joints. Leaves about 1 in. long, narrow and undivided, without teeth, growing in whorls of 6—12. Flowers very minute, greenish. Rootstock usually below water, creeping. P. 6—8.

CONTROL MEASURES : System I.

**MARIGOLD, Marsh** (*Caltha palustris*). King Cups. King Cobs.

Stems erect or prostrate, 1—3 ft. long, stout. Leaves large, rounded, heart-shaped to kidney-shaped, lower with stalks, upper stalkless. Flowers large, Buttercup-like, often 2 ins. in diameter, petals really absent, but sepals 5, bright golden yellow. Rootstock creeping. Common. P. 3—6.

CONTROL MEASURES : System II.

NOTES : Poisonous in a similar way to the Buttercups, but not usually fatal. Cattle and horses have been affected, but the plant is generally avoided.

**MARSHWORT** (*Apium nodiflorum*).

Stems mainly prostrate and creeping, 1—2 ft. or more, branched. Leaves deeply cut into segments, each egg-shaped with toothed edges. Flowers in umbels opposite to the leaves, petals 5, minute, white or greenish. Frequent. P. 7—8.

CONTROL MEASURES : System II.

**MILFOIL, Water** (*Myriophyllum spicatum*). Spiked Water Milfoil. (Fig. 28.)

Nearly related to Maretail (above). Stem slender,

branched, submerged or floating, often 3 ft. long. Leaves very finely divided, and growing usually in whorls of 4. Flowers in whorls in a leafless spike, minute, reddish. Rootstock creeping. Local. P. 6—8.

CONTROL MEASURES : System I.



Fig. 28.

WATER MILFOIL.  
(*Myriophyllum spicatum*.)  
(About  $\frac{2}{3}$  nat. size.)

**MINT, Water** (*Mentha aquatica*). Horse Mint.

A very variable plant. Stems from 1—4 ft. long, square, more or less prostrate. Leaves in opposite pairs, egg-shaped, 1—2 ins. long, toothed. Flowers in dense spikes 2—3 ins. long, corolla 4-lobed, purplish. Rootstock creeping. Abundant. P. 7—9.

CONTROL MEASURES : System II.

**PARSNIP, Water** (*Sium angustifolium*). Lesser Water Parsnip. (Fig. 29.)

Stem 1—2 ft. high, smooth, bearing numerous leaves. Leaves 3—6 ins. long, pinnate, leaflets lobed and toothed. Flowers in umbels opposite to the leaves, minute, petals



Fig. 29.

**WATER PARSNIP.**

(*Sium angustifolium*.)

(About  $\frac{2}{3}$  nat. size.)

5, white. Rootstock creeping extensively. Common.  
P. 6—8.

**CONTROL MEASURES:** System I.

**NOTES:** Said to be poisonous to cattle, but little seems to be known of its properties.

**PLANTAIN, Common Water** (*Alisma Plantago*).

Flower stalks  $1\frac{1}{2}$ —3 ft. high, branched. Leaves erect, about 6 ins. long, narrowly egg-shaped, stalked. Flowers

about  $\frac{1}{4}$  in. diameter, occurring singly at summits of branches, "petals" 3, pink or whitish. Common. P. 6—9.

CONTROL MEASURES : System II.

**PLANTAIN, Lesser Water** (*Alisma ranunculoides*).

Nearly related to Common Water Plantain (above), but much smaller, with narrower leaves, and purplish flowers usually in umbels. Frequent. P. 5—9.

CONTROL MEASURES : System II.



Fig. 30.

AMERICAN PONDWEED.

(*Elodea canadensis*.)

(About  $\frac{2}{3}$  nat. size.)

**PONDWEED, American** (*Elodea canadensis*). Canadian Pondweed. American Waterweed. Water Thyme. (Fig. 30.)

Stem 1—3 ft. or more, submerged, branched, often rooting at the joints. Leaves  $\frac{1}{2}$  in. long, narrowly lance-shaped, usually in whorls of 3. Flowers minute, floating, purplish-green. Multiplies vegetatively with great rapidity. An alien plant from America. Common. P. 5—10.

CONTROL MEASURES : System I.



**PONDWEED, Broad-leaved** (*Potamogeton natans*).

Floating Pondweed. (Fig. 31.)

Stem submerged, round, much branched. Floating leaves egg-shaped, leathery, stalked, submerged leaves absent, or very narrow and stalkless. Flowers in spikes



Fig. 31.

**BROAD-LEAVED PONDWEED.**

(*Potamogeton natans*.)

(About  $\frac{1}{2}$  nat. size.)

above the surface of the water, minute, greenish. Common.  
P. 6—9.

· **CONTROL MEASURES :** System I.

**PONDWEED, Curly** (*Potamogeton crispus*).

Stem submerged, slender, branched. Leaves all submerged, lance-shaped, stalkless, very bright green, alter-

nate below, opposite above, distinctly waved. Flowers in short loose spikes above the water, minute, greenish. Common. P. 6—8.

CONTROL MEASURES : System I.

**PONDWEED, Fennel-leaved** (*Potamogeton pectinatus*).

Stem submerged, much branched. Leaves very long and narrow, alternate, bright green, long-stalked. Flowers in whorled spikes, few, minute, greenish. Local. P. 6—8.

CONTROL MEASURES : System I.

**PONDWEED, Small** (*Potamogeton pusillus*).

Stem submerged, much branched, round or flattish. Leaves narrow and grass-like, some opposite, others alternate, pointed. Flowers in almost globular spikes on long stalks, greenish. Frequent. P. 7—8.

CONTROL MEASURES : System I.

**REED, Common** (*Phragmites communis*).

Stems erect, about 6 ft. high, often more, round, stout. Leaves flat, grass-like, stiff, up to 1 in. broad, greyish on under sides. Flowers in a large, dense, ornamental, terminal cluster, 1 ft. or more in length, composed of numerous small brownish spikelets. Rootstock creeping. Common. P. 7—8.

CONTROL MEASURES : System II.

**REEDMACE, Great** (*Typha latifolia*). Cat's-tail. Bulrush (erroneously).

Stem erect, 5—7 ft. round. Leaves nearly as long, flat, grass-like. Female flowers in dense, dark brown, poker-like spikes, often 9 ins. or more long, surmounted by loose male flowers, which soon wither. Rootstock creeping extensively. Common. P. 7—8.

CONTROL MEASURES : System II.

**RUSHES, Various.** (*Juncus* spp.) See Section II.

CONTROL MEASURES : System II. See also Section II.

**SEDGES, Various.** (*Carex* spp.) See Section II.

CONTROL MEASURES : System II. See also Section II.

**SPEARWORT, Greater** (*Ranunculus Lingua*).

Stems erect, 2—3 ft., branched, hollow, rooting below. Leaves narrow, about 8 ins. long, seldom exceeding 1 in. in width, stalkless, partly clasping stem. Flowers Buttercup-like, but usually about 2 ins. diameter, petals 5, yellow. Local. P. 7—9.

CONTROL MEASURES : System II.

**SPEARWORT, Lesser** (*Ranunculus Flammula*). See Section II.

CONTROL MEASURES : System II.

NOTES : Both the above species have poisonous properties similar to Buttercups. The Lesser Spearwort is very injurious and has often killed cattle and horses. The larger species is less harmful.

**SPEEDWELL, Marsh** (*Veronica scutellata*).

Stems branched,  $\frac{1}{2}$ —2 ft., partly prostrate and rooting, often with runners. Leaves narrowly lance-shaped, up to 2 ins. long, in opposite pairs, stalkless, partly embracing the stem. Flowers in alternate clusters, corolla  $\frac{1}{4}$  in. diameter, 4-lobed, pink or white, often streaked. Frequent. P. 6—8.

CONTROL MEASURES : System II.

**SPEEDWELL<sup>1</sup>, Water** (*Veronica Anagallis*).

Closely related to Marsh Speedwell (above), but differing mainly in its greater height, its larger leaves, and its opposite (instead of alternate) clusters of flowers. The corolla, however, is usually much less than  $\frac{1}{4}$  in. diameter, and of a pale mauve colour. Frequent. P. 6—8.

CONTROL MEASURES : System II.

**STARWORT, Water** (*Callitriche verna*). (Fig. 32.)

Related to Marestail (above), and like that plant, usually submerged. Stems rising to the surface of the water, usually with few or no branches, and about  $\frac{1}{2}$ —1 ft. long. Leaves very narrow when submerged, and in opposite pairs, but becoming inversely egg-shaped when floating, and assuming a rosette or star-like form. Flowers very minute, greenish. Common. A. or P. 4—10.

CONTROL MEASURES : System I.



Fig. 32.

**WATER STARWORT.**

(*Callitriche verna*.)

(About  $\frac{1}{2}$  nat. size.)

**WATER-LILY, White** (*Nymphaea alba*).

Rootstock stout, submerged, creeping. Leaves 6—10 ins. diameter, floating, rounded, with heart-shaped bases and very long stalks. Flowers about 4 ins. diameter, usually floating, pure white, handsome. Frequent. P. 6—8.

CONTROL MEASURES : System I.

**WATER-LILY, Yellow** (*Nuphar luteum*).

Rootstock stout, submerged, creeping. Leaves large, floating, roundish to heart-shaped, with lobes at base often overlapping, stalks long. Flowers about 2 ins. diameter

or more, rich golden yellow, handsome, fragrant. Frequent. P. 6—8.

CONTROL MEASURES : System I.

**WILLOWHERB, Great Hairy** (*Epilobium hirsutum*).

See Section II.

CONTROL MEASURES : System II.

## CONTROL MEASURES FOR AQUATIC PLANTS.

### *System I.* (For submerged plants.)

Water Weeds can be kept down only by periodical cutting. In small rivers and ponds this may be done with a special weed saw, consisting of a weighted chain with cutting teeth. A man walks on each side dragging the chain along, at the same time working it to and fro like a saw.

Cutting by hand from a boat, or from the bank, is practicable on a small scale.

For large sheets of water special machines for attaching to boats are obtainable, and there are certain firms who specialise in clearing lakes and watercourses from mud and weeds.

Swans keep weeds down to some extent, by eating the young shoots.

Where ponds and rivers are periodically cleared out, much of the mud being removed from their beds, this acts as one of the most effective weed destroying measures, because the perennial rootstocks of many weeds are thus removed bodily.

### *System II.* (For Semi-Aquatic Plants.)

Weeds along the margins of ditches and watercourses should be cut regularly, and ditches thoroughly cleared in the autumn. Poisonous species should be destroyed whenever seen.

Plants growing in shallow water at the edges of lakes and rivers (such as Reeds, Sedges, Bulrush, Water Plantain, etc.) may be kept within bounds by periodical cutting with the scythe or hook.

Care should be taken not to destroy all the cover for water birds, but to leave portions undisturbed each year.

In watercress beds, removal of the weeds by hand is the only practicable method. In all cases the roots should be got out whenever possible.



# APPENDICES.

## APPENDIX I.

### WEEDS OF ECONOMIC USE.

Although Weeds are mainly serious pests, against which the cultivator of the soil must wage incessant warfare, many of the wild plants commonly termed "weeds" are capable of being put to useful purposes.

Many common weeds were employed in medicine by the old herbalists of the past, and some are still used by the druggists of to-day. Only the more important of these are included in the following list.

Some wild plants have been used for dyeing and others for human food, but these and many other uses have largely died out, except in some remote parts of the British Isles and the more backward European countries.

The recognised fodder plants are not included in the following list (unless, like the Mustards, they have some other use), but many of the weeds mentioned possess sufficient feeding value to have often been used for this purpose; some, like Nettles, Spurrey, and Bird's-foot Trefoil, being actually grown for fodder.

Plants used for litter, or thatching purposes are also included.

Whenever a weed has been, or still is, put to a useful purpose, this will be found mentioned in the "Notes" on the species in question, unless the supposed useful properties are now known to be entirely fanciful and superstitious.

In addition to these weeds which have specific uses, most annual weeds (if ploughed or dug in before they seed) are useful as green manure. Thus they add humus and conserve certain plant foods, which might be dissolved out of the soil if it were left entirely bare. Nitrates, phosphates and potash are taken up by the weeds, which on decaying return these foods to the soil.

Agrimony.  
Barberry.  
Bedstraw, Yellow.  
Bindweed, Common.  
Blackberry.  
Broom.  
Bugloss, Viper's.  
Burdock.  
Burnet, Salad.  
Celandine, Lesser.  
Chicory.  
Chickweed.  
Coltsfoot.  
Corn Salad.  
Cowslip.  
Crane's-bill.  
Crowfoot, Water.  
Cudweed.  
Dandelion.  
Dock, Broad-leaved.  
Duckweed.  
Dyer's Green Weed.  
Eyebright.  
Fern, Bracken.  
Flax, Purging.  
Fumitory.  
Gentian, Field.  
Gold of Pleasure.  
Goosefoot.  
Gorse.  
Goutweed.  
Grass, Couch.  
Gromwell, Corn.  
Groundsel.  
Heather.

Hemp Agrimony.  
Herb Bennet.  
Herb Robert.  
Hogweed.  
Hop, Common.  
Iris, Yellow.  
Knapel, Annual.  
Knotgrass.  
Lady's Mantle.  
Meadowsweet.  
Medick, Black.  
Mint, Corn.  
Mugwort.  
Mustard, Black.  
Mustard, White.  
Nettle, Great.  
Persicaria.  
Pignut.  
Pimpernel, Scarlet.  
Plantain, Greater.  
Plantain, Ribwort.  
Poppy, Red.  
Rushes.  
Saffron, Meadow.  
Sedges.  
Selfheal.  
Silverweed.  
Sorrel, Common.  
Sowthistle, Common.  
Spurrey.  
Toadflax.  
Tormantil.  
Trefoil, Bird's-foot.  
Yarrow.

## APPENDIX 2.

### WEEDS WITH POISONOUS OR INJURIOUS PROPERTIES LIKELY TO AFFECT ANIMALS.

No attempt has been made to include *all* poisonous plants in this list, only those which occur as weeds being mentioned.

These weeds may be injurious to stock in three ways, and so could be divided into the following groups :—

- (1) Poisonous plants, likely to cause death or severe illness (some species mentioned are suspected, but not definitely proved, to be poisonous).
- (2) Plants causing mechanical injury, or internal obstruction or digestive trouble.
- (3) Plants which, when eaten by cows, taint the milk and its products.

For details concerning each species refer to the text.

Bindweed, Black.  
Bindweed, Common.  
Broom.  
Broomrapes.  
Buttercups.  
Chamomile, Corn.  
Celandine, Lesser.  
Charlock.  
Chickweed.  
Clematis, Wild.  
Corn Cockle.  
Cow-wheat, Purple.  
Crowfoot, Celery-leaved.  
Dodder.  
Dropwort, Water.  
Dyer's Green Weed.  
Figwort, Water.  
Flax, Purging.  
Garlic, Crow.  
Grass, Darnel.  
Horsetails.  
Iris, Yellow.  
Lousewort.  
Marigold, Marsh.  
Mayweed, Stinking.  
Mercury, Annual.

Mustard, Black.  
Mustard, Garlic.  
Nightshade, Black.  
Parsley, Fool's.  
Parsley, Wild Beaked.  
Parsnip, Water.  
Penny Cress.  
Persicaria.  
Pimpernel, Scarlet.  
Poppy, Red.  
Raddish, Wild.  
Ragwort.  
Shepherd's Purse.  
Silverweed.  
Sorrel, Common.  
Sorrel, Sheep's.  
Spearwort, Greater.  
Spearwort, Lesser.  
Spurge, Caper.  
Spurge, Dwarf.  
Spurge, Petty.  
Spurge, Sun.  
Tansy.  
Toadflax.  
Yellow Rattle.

### APPENDIX 3.

#### WEEDS KNOWN TO SERVE AS HOST PLANTS FOR INSECT PESTS AND FUNGOID DISEASES ATTACKING CULTIVATED PLANTS.

Weeds play a great part in the dissemination of insect pests and fungoid diseases which attack cultivated plants, and in this fact lies one great incentive to their destruction.

Many pests of cultivated crops also attack the related wild plants indiscriminately; thus the Turnip Beetle and Club-Root Disease not only infest our crops of the Turnip and Cabbage family, but also allied weeds, such as Charlock, Shepherd's Purse, etc.

Other pests, as some of the Aphides and a few Fungi, have definite alternate host plants, passing one generation (or series of generations) on one host, and the next on a different host. In many cases one host is a cultivated plant and the next a weed. Thus the Bean Aphis alternates between Beans and Docks, Thistles or Knapweed; the Oat-Apple Aphis between the apple and oats or wild grasses; and the Wheat Rust between wheat and grasses, and the Barberry.

For details of the pests which these weeds encourage refer to the text.

Agrimony.	Hop, Common (Wild).
Barberry.	Meadowsweet.
Blackberry.	Mint, Corn.
Burdock.	Mustard, Garlic.
Charlock.	Mustard, Hedge.
Chickweeds.	Plantain, Ribwort.
Coltsfoot.	Rest Harrow.
Crane's-bills.	Scabious.
Docks.	Sedges.
Garlic, Crow.	Shepherd's Purse.
Goat's Beard.	Sorrel, Common.
Gorse.	Sowthistle, Common.
Grass, Couch.	Tansy.
Grass, Wild Oat.	Thistles.
Groundsel.	Willow Herbs.
Hawkweeds.	Yarrow.

## APPENDIX 4.

### INSECT PESTS AND FUNGOID DISEASES ENCOURAGED BY WEEDS MENTIONED IN APPENDIX 3.

The following list is given so that any particular pest or disease associated with weeds may be readily turned up in the text, to see what plants are concerned in its dispersal.

The scientific names of the various insects and disease organisms are given here, because in the text most of them are referred to only under their popular names.

Apple Aphis, Blue.	( <i>Aphis malifoliæ</i> ), 98.
Bean Aphis.	( <i>Aphis rumicis</i> ), 64, 109, 129.
Cabbage & Turnip Gall Weevil.	( <i>Ceutorhynchus pleurostigma</i> ), 55, 88.
Cabbage Root Fly.	( <i>Chortophilla brassicæ</i> ), 55, 88, 102.
Cabbage White Rust.	( <i>Cystopus candidus</i> ), 102.
Carnation Rust.	( <i>Uromyces caryophyllinus</i> ), 56.
Celery Fly.	( <i>Acidia heraclei</i> ), 109.
Chrysanthemum Rust.	( <i>Puccinia chrysanthemi</i> ), 110, 117, 135.
Cineraria Leaf Rust.	( <i>Coleosporum senecionis</i> ), 78.
Clover Stem Rot.	( <i>Sclerotinia trifoliorum</i> ), 143.
Club Root, or Finger & Toe.	( <i>Plasmodiphora brassicæ</i> ), 55, 102.
Cockchafer.	( <i>Melolontha vulgaris</i> ), 58.
Crane Flies.	( <i>Tipula</i> , spp.), 55.
Currant & Lettuce Aphis.	( <i>Rhopalosiphum lactusæ</i> ), 104.
Diamond Back Moth.	( <i>Plutella maculipennis</i> ), 55, 88.
Frit Fly.	( <i>Oscinella frit</i> ), 74.
Gooseberry Cluster Cups.	( <i>Puccinia pringsheimiana</i> ), 146.
Gout Fly.	( <i>Chlorops tæniopus</i> ), 74.
Hop & Damson Aphis.	( <i>Aphis humuli</i> ), 137.
Hop Mildew.	( <i>Sphærotheca humuli</i> ), 114, 122, 137, 139, 152, 153.
Lettuce Mildew.	( <i>Bremia lactucæ</i> ), 69, 100, 110, 135.
Mangold Fly.	( <i>Pegomyia betæ</i> ), 64, 109.
Mint Rust.	( <i>Puccinia menthæ</i> ), 86.
Oat-Apple Aphis.	( <i>Siphocoryne avenæ</i> ), 77.
Onion Rust.	( <i>Puccinia porri</i> ), 68.
Pea Root Rot.	( <i>Thielavia basicola</i> ), 78.
Raspberry Aphis.	( <i>Siphonophora rubi</i> ), 116.
Raspberry Beetle.	( <i>Byturus tomentosus</i> ), 116.
Strawberry Mildew.	( <i>Sphærotheca humuli</i> ), 122, 137, 139, 152, 153.
Sunflower Rust.	( <i>Puccinia tanacetii</i> ), 108.
Swift Moths.	( <i>Hepialus</i> spp.), 58, 64, 110.
Turnip Flea Beetle.	( <i>Phyllotreta nemorum</i> ), 55, 88, 102.
Wheat Rust.	( <i>Puccinia graminis</i> ), 45.
Wireworms (larvæ of Click Beetles).	( <i>Agriotes</i> spp.), 58.

## APPENDIX 5.

### INJURIOUS WEEDS SCHEDULED BY THE MINISTRY OF AGRICULTURE.

- (1) Under the Agriculture Act, 1920, the Ministry of Agriculture (through the County Agricultural Committees) can serve a notice on the occupier of any land, where certain weeds are growing unchecked, requiring the destruction of such weeds within a specified time and in the manner stated in the notice. A fine not exceeding £20 can be imposed for failure to comply with the notice, and after conviction a fine not exceeding £1 a day for as long as the default continues.
- (2) Under the Seeds Act, 1920, and the Seeds Regulations, 1921, dealers are required to declare the presence of certain weed seeds in samples of grass and clover seeds offered for sale, if exceeding one per cent. in grasses or two per cent. in clovers.

To sell, or knowingly use for sowing, farm seeds containing more than five per cent. of these injurious weeds is illegal.

In the case of Dodder, its presence must be declared if exceeding one seed in four ounces of Red Clover, Crimson Clover, Lucerne or Flax, and one seed in two ounces of Alsike or White Clover.

The plants scheduled under both Acts are given below.

#### I. WEEDS SCHEDULED UNDER THE AGRICULTURE ACT, 1920, FOR COMPULSORY DESTRUCTION.

Dock, Broad-leaved.	( <i>Rumex obtusifolius</i> .)
Dock, Curled.	( <i>Rumex crispus</i> .)
Ragwort.	( <i>Senecio Jacobæa</i> .)
Thistle, Creeping.	( <i>Cnicus arvensis</i> .)
Thistle, Spear.	( <i>Cnicus lanceolatus</i> .)



II. WEEDS SCHEDULED UNDER THE SEEDS ACT, 1920, AND  
SEEDS REGULATIONS, 1921, FOR DECLARATION IN  
CLOVER AND GRASS SEEDS OFFERED FOR SALE.

Carrot, Wild.	( <i>Daucus Carota.</i> )
Crane's-bills.	( <i>Geranium</i> spp.)
Docks.	( <i>Rumex</i> spp.)
Dodder.	( <i>Cuscuta</i> spp.)
Grass, Meadow Soft (Yorkshire Fog).	( <i>Holcus lanatus.</i> )
Grass, Soft Brome.	( <i>Bromus mollis.</i> )
Sorrels.	( <i>Rumex</i> spp.)

## APPENDIX 6.

### NOTES ON CHEMICAL APPLICATIONS FOR WEED DESTRUCTION.

#### *Ammonium Sulphate.*

Sulphate of Ammonia contains about 24 per cent. of ammonia (equivalent to 20 per cent. of nitrogen) and is largely used as a nitrogenous fertiliser. Its weed-killing properties depend on the corrosive action of the sulphuric acid it contains, which scorches up the foliage of broad-leaved plants. Cereals and grasses are only slightly injured, because they retain comparatively little of the solution or powder, but are stimulated to vigorous growth by that which reaches the roots.

It is usually employed in the form of a 20 per cent. or 30 per cent. solution (*i.e.*, 80 lbs. or 120 lbs. in 40 gallons of water) and applied at the rate of 60 gallons per acre.

#### *Bordeaux Mixture.*

This is chiefly used as a fungicide for spraying potatoes and fruit trees, but may also be used for killing Algæ and Duckweed in ponds. It consists of a mixture of copper sulphate and quicklime, in water; but plain copper sulphate solution is more effective for weed destruction.

#### *Carbolic Acid.*

A dangerous poison, largely used as a disinfectant, insecticide, and weed killer. As commercial Carbolic Acid (97 per cent.) is somewhat difficult to mix with water, it is best procured as "Soluble Carbolic Acid," containing about 33 per cent. of acid.

The 5 per cent. solution for the destruction of Garlic may be made with 15 gallons of the 33 per cent. acid in 100 gallons of water; sufficient to treat one acre.

#### *Copper Sulphate.*

This should be obtained in the form of very fine crystals (like fine sugar), not in large crystals or powder.

For destroying Charlock and other weeds it may be

employed in various strengths according to requirements; 3 per cent. (12 lbs. in 40 galls.), 4 per cent. (16 lbs. in 40 galls.) and 5 per cent. (20 lbs. in 40 galls.) are the most suitable, 40 to 60 gallons being used per acre. It must only be used on cereal crops.

Full instructions for its use in ponds are given on page 165.

### *Iron Sulphate.*

Acts in a similar way to Copper Sulphate and is cheaper, but requires to be used very much stronger. A 15 per cent. solution (60 lbs. in 40 galls.) is the usual strength for killing weeds in corn crops. From 40 to 60 gallons are used per acre. It is also applied dry, in the form of a fine powder, at the rate of 5 cwt. per acre. For killing Moss and Fungi on lawns it may be used either dry or in solution.

### *Kainit.*

A cheap potash salt, largely used as a manure. Its use as a weed destroyer is quite recent, but the ordinary manurial Kainit is useless; it requires to be in form of a fine powder.

It is chiefly used against Charlock and Nettles, which see.

### *“Lawn Sand.”*

There are a variety of proprietary “Lawn Sands” for killing Daisies and other broad-leaved weeds on lawns, and most are satisfactory if properly applied. In spite of the name, sand does not enter very largely into the composition of these preparations, and some makes do not contain any.

The active principle consists of corrosive and hygroscopic mineral salts, which, if applied in dry weather, scorch the weeds and absorb all the moisture from them. The upright smooth blades of the grass retain little, if any, of the Lawn Sand, and so are hardly affected.

To secure good results, each weed requires treating separately and well covering with Lawn Sand.

Later, when the soluble ingredients get washed into the soil, they act as a stimulant to the grass.

See Chapter 4 for further information.

*Salt* (Sodium Chloride).

Salt is well known to be destructive to plant life, and is often used as a weed killer on paths and roadways, and also against Yellow Rattle in pastures.

*Sulphuric Acid* (Oil of Vitriol).

A very powerful corrosive, destroying nearly everything it touches, and consequently requiring extreme care in handling.

It is sometimes used (greatly diluted) for killing weeds on paths, but is not to be recommended.

Its principal use is for destroying Bracken. (See p. 125.)

In diluting Sulphuric Acid always pour the acid slowly into the water; never pour water into the acid, or disastrous results may follow.

Only glass or earthenware vessels must be used for the strong acid.

*“ Weed Killer.”*

Arsenical Weed Killer consists chemically of Sodium Arsenite, in liquid or powder form, and is the most effective preparation for killing weeds in garden paths and similar situations.

For further details see Section III.

## APPENDIX 7.

### SOME BOOKS OF REFERENCE.

*Note.*—The following books, amongst others, have been consulted by the Authors in the preparation of the present work, and can be confidently recommended in all cases where it is desired to pursue further the studies here begun.

“Manual of British Botany,” by Charles Cardale Babington, M.A., F.R.S., F.L.S., 612 pp., with full Index, Glossary and Appendices. Tenth Edition, Edited by A. J. Wilmott, B.A., F.L.S. Gurney & Jackson, London, 16s. od. net. Printed on thin paper of excellent quality, and bound in limp cloth with rounded corners, this Manual makes an admirable pocket reference book for use in the field. (See also Chapter 4, p. 25.)

“Handbook of the British Flora,” by George Bentham, C.M.G., F.R.S., revised by Sir J. D. Hooker, K.C.S.I., C.B., F.R.S., 606 pp., with full Index, Glossary and Outlines of Botany. Seventh Edition revised by A. B. Rendle, M.A., D.Sc., F.R.S. L. Reeve & Co., Ltd., London, 12s. od. net. Although too large for pocket use, this new Edition of a famous Flora forms a valuable work of reference for all students of British botany, and contains concise descriptions of all our flowering plants and ferns. A companion volume of 1,321 illustrations is also published at the same price. It contains a very useful “key” to the Natural Orders; and the drawings of the plants are so accurately and clearly drawn that a plant may often be identified at a glance, without the necessity of reading any description at all. Full particulars of both these volumes may be obtained from the Publishers at 6, Henrietta Street, Covent Garden, London, W.C.

“British Grasses, and their Employment in Agriculture,” by S. F. Armstrong, B.A., F.L.S., 199 pp., with full Index, Glossary, Bibliography, Appendix, and 175 illustrations. Second Edition. Cambridge University Press, 10s. 6d. net. An indispensable guide to the student of our native grasses from an agricultural standpoint. (See further Chapter 4, p. 25.)

“Plants Poisonous to Live Stock,” by Harold C. Long, B.Sc., 120 pp., with full Index and an excellent Bibliography. Second Edition revised. Cambridge University Press, 8s. 6d. net. A valuable work of reference for all keepers of live stock, dealing very thoroughly with all our weeds known to contain toxic principles, and with their effects upon the animals of the farm.

“Pests of the Garden and Orchard, Farm and Forest,” by Ray Palmer, F.E.S., and W. P. Westell, F.L.S., 412 pp., with full Indexes, Glossary, three coloured plates and 132 illustrations, mainly from photographs by Ray Palmer. Dranes, Ltd., London, 25s. od. net.

A practical guide for the use of the Estate Owner, Farmer, Fruit Grower and Gardener, concerning the Insects, Birds and other animals, Fungoid Diseases, etc. affecting agriculture, horticulture and forestry; together with remedial and preventive measures.

Chemicals used as insecticides and fungicides are fully dealt with, and many valuable formulæ are included, together with a large amount of miscellaneous information.



## APPENDIX 8.

### CLASSIFICATION OF WEEDS UNDER THEIR NATURAL ORDERS.

In the interests of scientific students of weeds, the whole of the plants described in this volume have been arranged under four natural divisions, beginning with the most highly organised flowering plants, and descending gradually to those lowly forms which have no true roots, stems, leaves, flowers or seeds, such as the Fungi and Algæ.

*Division I.* Angiosperms (Plants bearing seeds enclosed in a fruit).

The whole of the flowering plants dealt with in the preceding pages fall in this Division. In the following list the scientific name of each plant is given under its appropriate Natural Order, and both the Orders themselves and the plant names are arranged alphabetically for easy reference.

#### ALISMACEÆ.

*Alisma Plantago.*  
*Alisma ranunculoides.*  
*Sagittaria sagittifolia.*

#### BERBERIDACEÆ.

*Berberis vulgaris.*

#### BORAGINACEÆ.

*Echium vulgare.*  
*Lithospermum arvense.*  
*Lycopsis arvensis.*  
*Myosotis arvensis.*  
*Myosotis versicolor.*  
*Symphytum officinale.*

#### CAMPANULACEÆ.

*Jasione montana.*  
*Legousia hybrida.*

#### CARYOPHYLLACEÆ.

*Arenaria serpyllifolia.*  
*Cerastium vulgatum.*  
*Lychnis diurna.*  
*Lychnis Flos-cuculi.*  
*Lychnis Githago.*  
*Lychnis vespertina.*  
*Sagina procumbens.*  
*Silene inflata.*  
*Spergula arvensis.*  
*Stellaria media.*

#### CHENOPODIACEÆ.

*Atriplex hastata.*  
*Atriplex patula.*  
*Chenopodium album.*  
*Chenopodium rubrum.*

#### COMPOSITÆ.

*Achillea Millefolium.*  
*Anthemis arvensis.*  
*Anthemis Cotula.*  
*Arctium Lappa.*  
*Artemisia vulgaris.*  
*Bellis perennis.*  
*Carduus crispus.*  
*Carduus nutans.*  
*Carlina vulgaris.*  
*Centaurea Cyanus.*  
*Centaurea nigra.*  
*Centaurea Scabiosa.*  
*Chrysanthemum Leucanthemum*  
*Chrysanthemum segetum.*  
*Cichorium Intybus.*  
*Cnicus acaulis.*  
*Cnicus arvensis.*  
*Cnicus lanceolatus.*  
*Cnicus palustris.*  
*Crepis taraxacifolia.*  
*Crepis virens.*  
*Eupatorium cannabinum.*  
*Filago germanica.*  
*Gnaphalium uliginosum.*

*Hieracium Pilosella.*  
*Hypochaeris radicata.*  
*Lapsana communis.*  
*Leontodon autumnalis.*  
*Leontodon hirtus.*  
*Leontodon hispidus.*  
*Matricaria Chamomilla.*  
*Matricaria discoidea.*  
*Matricaria inodora.*  
*Onopordon Acanthium.*  
*Petasites vulgaris.*  
*Senecio Jacobæa.*  
*Senecio vulgaris.*  
*Sonchus arvensis.*  
*Sonchus oleraceus.*  
*Tanacetum vulgare.*  
*Taraxacum vulgare.*  
*Tragopogon pratensis.*  
*Tussilago Farfara.*

#### CONVOLVULACEÆ.

*Convolvulus arvensis.*  
*Convolvulus sepium.*  
*Cuscuta Trifolii.*

#### CRUCIFERÆ.

*Brassica alba.*  
*Brassica nigra.*  
*Brassica Sinapis.*  
*Camelina sativa.*  
*Capsella Bursa-pastoris.*  
*Cardamine flexuosa.*  
*Cardamine hirsuta.*  
*Cardamine pratensis.*  
*Clematis Vitalba.*  
*Draba verna.*  
*Iberis amara.*  
*Lepidium campestre.*  
*Lepidium Draba.*  
*Raphanus Raphanistrum.*  
*Senebiera Coronopus.*  
*Sisymbrium Alliaria.*  
*Sisymbrium officinale.*  
*Sisymbrium Thaliana.*  
*Thlaspi arvense.*

#### CYPERACEÆ.

*Carex* spp.  
*Eriophorum angustifolium.*  
*Eriophorum vaginatum.*  
*Scirpus lacustris.*

#### DIPSACACEÆ.

*Dipsacus sylvestris.*  
*Scabiosa arvensis.*

*Scabiosa Columbaria.*  
*Scabiosa succisa.*

#### EPILOBIACEÆ.

*Epilobium hirsutum.*  
*Epilobium parviflorum.*

#### ERICACEÆ.

*Calluna vulgaris.*  
*Erica Tetralix.*

#### EUPHORBIACEÆ.

*Euphorbia exigua.*  
*Euphorbia Helioscopia.*  
*Euphorbia Lathyrus.*  
*Euphorbia Peplus.*  
*Mercurialis annua.*

#### FUMARIACEÆ.

*Fumaria officinalis.*

#### GENTIANACEÆ.

*Erythraea Centaurium.*  
*Gentiana campestris.*

#### GERANIACEÆ.

*Erodium cicutarium.*  
*Geranium dissectum.*  
*Geranium molle.*  
*Geranium pratense.*  
*Geranium pusillum.*  
*Geranium Robertianum.*

#### GRAMINACEÆ.

*Agropyron repens.*  
*Agrostis alba.*  
*Agrostis stolonifera.*  
*Agrostis vulgaris.*  
*Aira cæspitosa.*  
*Aira flexuosa.*  
*Alopecurus agrestis.*  
*Alopecurus geniculatus.*  
*Arrhenatherum avenaceum.*  
*Arrhenatherum avenaceum, var.*  
*bulbosum.*  
*Avena fatua.*  
*Briza media.*  
*Bromus arvensis.*  
*Bromus mollis.*  
*Bromus racemosus.*  
*Bromus secalinus.*  
*Bromus sterilis.*  
*Dactylis glomerata.*  
*Holcus lanatus.*

*Holcus mollis.*  
*Hordeum murinum.*  
*Hordeum pratense*  
*Lolium temulentum.*  
*Nardus stricta.*  
*Phragmites communis.*  
*Poa annua.*

HALORAGACEÆ.

*Callitriche verna.*  
*Hippuris vulgaris.*  
*Myriophyllum spicatum.*

HYDROCHARIDACEÆ.

*Elodea canadensis.*

ILLECEBRACEÆ.

*Schleranthus annuus.*

IRIDACEÆ.

*Iris pseudacorus.*

JUNCACEÆ.

*Juncus* spp.  
*Luzula campestris.*

LABIATÆ.

*Ajuga reptans.*  
*Galeopsis Tetrahit.*  
*Lamium album.*  
*Lamium amplexicaule.*  
*Lamium purpureum.*  
*Mentha aquatica.*  
*Mentha arvensis.*  
*Prunella vulgaris.*  
*Stachys arvensis.*

LEGUMINOSÆ.

*Cytisus scoparius.*  
*Genista tinctoria.*  
*Lotus corniculatus.*  
*Medicago lupulina.*  
*Ononis repens.*  
*Ononis spinosa.*  
*Trifolium dubium.*  
*Trifolium procumbens.*  
*Trifolium repens.*  
*Ulex europæus.*  
*Ulex nanus.*

LEMNACEÆ.

*Lemna minor.*  
*Lemna polyrrhiza.*  
*Lemna trisulca.*

LILIACEÆ.

*Allium oleraceum.*  
*Allium ursinum.*  
*Allium vineale.*  
*Colchicum autumnale.*

LINACEÆ.

*Linum catharticum.*

LYTHRACEÆ.

*Lythrum Salicaria.*

NAIADACEÆ.

*Potamogeton crispus.*  
*Potamogeton natans.*  
*Potamogeton pectinatus.*  
*Potamogeton pusillus.*

NYMPHACEÆ.

*Nuphar luteum.*  
*Nymphaea alba.*

ORCHIDACEÆ.

*Orchis maculata.*

OROBANCHACEÆ.

*Orobanche minor.*

PAPAVERACEÆ.

*Papaver Argemone.*  
*Papaver dubium.*  
*Papaver Rhæas.*

PLANTAGINACEÆ.

*Plantago Coronopus.*  
*Plantago lanceolata.*  
*Plantago major.*  
*Plantago maritima.*  
*Plantago media.*

PLUMBAGINACEÆ.

*Armeria vulgaris.*

POLYGALACEÆ.

*Polygala vulgaris.*

POLYGONACEÆ.

*Polygonum aviculare.*  
*Polygonum Convolvulus.*  
*Polygonum Persicaria.*  
*Rumex Acetosa.*  
*Rumex Acetosella.*  
*Rumex conglomeratus.*  
*Rumex crispus.*



Classification of Plants

188

1. *Monocotyledonae*. - These having one cotyledon, and are mostly of the grassy type, but some are woody.

2. *Dicotyledonae*. - These having two cotyledons, and are mostly of the woody type, but some are grassy.

3. *Gymnosperms*. - These having naked seeds, and are mostly of the woody type, but some are grassy.

4. *Angiosperms*. - These having seeds enclosed in a fruit, and are mostly of the woody type, but some are grassy.

5. *Algae*. - These having no true roots, stems, or leaves, and are mostly of the watery type, but some are of the woody type.

6. *Fungi*. - These having no true roots, stems, or leaves, and are mostly of the watery type, but some are of the woody type.

7. *Bacteria*. - These having no true roots, stems, or leaves, and are mostly of the watery type, but some are of the woody type.

8. *Protozoa*. - These having no true roots, stems, or leaves, and are mostly of the watery type, but some are of the woody type.

9. *Plasma*. - These having no true roots, stems, or leaves, and are mostly of the watery type, but some are of the woody type.

# INDEX I.

## SCIENTIFIC NAMES.

- Achillea Millefolium*, 153, 162.  
*Ægopodium Podagraria*, 70, 129.  
*Æthusa Cynapium*, 93.  
*Aira cæspitosa*, 132.  
*Aira flexuosa*, 133.  
*Agrimonia Eupatoria*, 114.  
*Agropyron repens*, 73, 129, 157.  
*Agrostis alba*, 76, 134.  
*Agrostis stolonifera*, 74.  
*Agrostis vulgaris*, 72, 129, 157.  
*Ajuga reptans*, 116.  
*Alchemilla arvensis*, 82.  
*Alchemilla vulgaris*, 138.  
*Alisma Plantago*, 173.  
*Alisma ranunculoides*, 174.  
*Allium oleraceum*, 68.  
*Allium ursinum*, 67, 127.  
*Allium vineale*, 68, 127.  
*Alopecurus agrestis*, 72.  
*Alopecurus geniculatus*, 130, 169.  
*Anagallis arvensis*, 96.  
*Anthemis arvensis*, 53.  
*Anthemis Cotula*, 84.  
*Anthriscus sylvestris*, 141.  
*Anthriscus vulgaris*, 140.  
*Apium nodiflorum*, 171.  
*Arctium Lappa*, 116.  
*Arenaria serpyllifolia*, 100.  
*Armeria vulgaris*, 162.  
*Arrhenatherum avenaceum*, 75.  
*Arrhenatherum avenaceum*, var.  
     *bulbosum*, 76.  
*Artemisia vulgaris*, 87.  
*Atriplex hastata*, 92.  
*Atriplex patula*, 92.  
*Avena fatua*, 77.  
  
*Bartsia Odontites*, 45, 114.  
*Bartsia viscosa*, 114.  
*Bellis perennis*, 123, 155.  
*Berberis vulgaris*, 45.  
*Brassica alba*, 88.  
*Brassica nigra*, 87.  
*Brassica Sinapis*, 54.  
*Briza media*, 132.  
*Bromus arvensis*, 75.  
*Bromus mollis*, 132.  
*Bromus racemosus*, 76.  
*Bromus secalinus*, 76.  
*Bromus sterilis*, 129.  
  
*Callitriche verna*, 178.  
  
*Calluna vulgaris*, 136.  
*Caltha palustris*, 171.  
*Camelina sativa*, 69.  
*Capsella Bursa-Pastoris*, 101, 161.  
*Carex* spp. 146, 177.  
*Cardamine hirsuta*, 48.  
*Cardamine flexuosa*, 48.  
*Cardamine pratensis*, 138.  
*Carduus crispus*, 110, 149, 161.  
*Carduus nutans*, 110, 149.  
*Carlina vulgaris*, 148.  
*Carum segetum*, 93.  
*Caucalis Anthriscus*, 141.  
*Caucalis arvensis*, 94.  
*Caucalis nodosa*, 93.  
*Centaurea Cyanus*, 59.  
*Centaurea nigra*, 80, 137.  
*Centaurea Scabiosa*, 81, 137.  
*Cerastium vulgatum*, 57, 120, 154.  
*Chenopodium album*, 70.  
*Chenopodium rubrum*, 69.  
*Chrysanthemum Leucanthemum*,  
     123.  
*Chrysanthemum segetum*, 83.  
*Cichorium Intybus*, 55.  
*Clematis Vitalba*, 120.  
*Cnicus acaulis*, 148, 161.  
*Cnicus arvensis*, 108, 148, 161.  
*Cnicus lanceolatus*, 110, 149, 161.  
*Cnicus palustris*, 149.  
*Colchicum autumnale*, 144.  
*Conopodium denudatum*, 141.  
*Convolvulus arvensis*, 47, 115, 154.  
*Convolvulus sepium*, 48.  
*Crepis taraxacifolia*, 78, 135.  
*Crepis virens*, 78, 135.  
*Cuscuta Trifolii*, 65, 124.  
*Cytisus scoparius*, 116.  
  
*Dactylis glomerata*, 157.  
*Daucus Carota*, 53, 119.  
*Dipsacus sylvestris*, 148.  
*Draba verna*, 112.  
  
*Echium vulgare*, 49.  
*Elodea canadensis*, 174.  
*Epilobium hirsutum*, 152, 179.  
*Epilobium parviflorum*, 152.  
*Equisetum arvense*, 80, 137.  
*Equisetum limosum*, 169.  
*Equisetum maximum*, 170.  
*Eriophorum angustifolium*, 146.



Eriophorum vaginatum, 146.  
Erica Tetralix, 135.  
Erodium cicutarium, 108.  
Erythræa Centaurium, 120.  
Eupatorium cannabinum, 169.  
Euphorbia exigua, 106.  
Euphorbia helioscopia, 107.  
Euphorbia Lathyrus, 106.  
Euphorbia Peplis, 107.  
Euphrasia officinalis, 125.

Filago germanica, 62.  
Fumaria officinalis, 67.

Galeopsis Tetrahit, 79.  
Galium Aparine, 70.  
Galium palustre, 114.  
Galium tricornis, 45.  
Galium verum, 115, 154.  
Genista tinctoria, 124.  
Gentiana campestris, 128.  
Geranium dissectum, 60, 121.  
Geranium molle, 60, 122.  
Geranium pratense, 122.  
Geranium pusillum, 60.  
Geranium Robertianum, 79.  
Geum urbanum, 136.  
Gnaphalium uliginosum, 61, 123.

Heracleum Sphondylium, 79, 136.  
Hieracium Pilosella, 135, 157.  
Hippuris vulgaris, 171.  
Holcus lanatus, 131, 157.  
Holcus mollis, 129.  
Hordeum pratense, 130.  
Hordeum murinum, 133.  
Humulus Lupulus, 137.  
Hydrocotyle vulgaris, 141.  
Hypochaeris radicata, 119, 154.

Iberis amara, 53.  
Iris Pseud-acorus, 170.

Jasione montana, 145.  
Juncus spp. 143, 161, 177.

Lamium album, 63.  
Lamium amplexicaule, 63.  
Lamium purpureum, 63.  
Lapsana communis, 91, 140.  
Legousia hybrida, 51.  
Lemna minor, 168.  
Lemna polyrrhiza, 168.  
Lemna trisculca, 168.  
Leontodon autumnalis, 134.

Leontodon hirtus, 157.  
Leontodon hispidus, 135.  
Lepidium campestre, 95.  
Lepidium Draba, 95.  
Linaria Elatine, 111.  
Linaria spuria, 111.  
Linaria vulgaris, 112.  
Linum catharticum, 126.  
Lithospermum arvense, 77.  
Lolium temulentum, 74.  
Lotus corniculatus, 151, 162.  
Luzula campestris, 152, 162.  
Lychnis diurna, 52, 118.  
Lychnis Flos-cuculi, 142.  
Lychnis Githago, 58.  
Lychnis vespertina, 52, 118.  
Lycopsis arvensis, 49.  
Lythrum Salicaria, 170.

Marasmius oreades, 156.  
Matricaria Chamomilla, 54.  
Matricaria discoidea, 84.  
Matricaria inodora, 84.  
Medicago lupulina, 85, 139, 159.  
Melampyrum arvense, 59.  
Melampyrum pratense, 121.  
Mentha aquatica, 172.  
Mentha arvensis, 86.  
Mercurialis annua, 85.  
Myosotis arvensis, 66.  
Myosotis versicolor, 66.  
Myosurus minimus, 86.  
Myriophyllum spicatum, 171.

Nardus stricta, 130.  
Nymphæa alba, 178.  
Nuphar luteum, 178.

Oenanthe crocata, 167.  
Ononis repens, 99, 143.  
Ononis spinosa, 100, 143.  
Onopordon Acanthium, 110, 149.  
Orchis maculata, 140.  
Orobanche minor, 48.

Papaver Argemone, 99.  
Papaver dubium, 98.  
Papaver Rhœas, 98.  
Paxillus giganteus, 156.  
Pedicularis palustris, 138.  
Pedicularis sylvatica, 138.  
Peltigera canina, 158.  
Petasites vulgaris, 117.  
Phragmites communis, 176.  
Plantago Coronopus, 159.

- Plantago lanceolata*, 97, 142, 161.  
*Plantago major*, 97, 142, 160.  
*Plantago maritima*, 161.  
*Plantago media*, 97, 142, 161.  
*Poa annua*, 72.  
*Polygala vulgaris*, 139.  
*Polygonum aviculare*, 81, 158.  
*Polygonum Convolvulus*, 46.  
*Polygonum Persicaria*, 96.  
*Potamogeton crispus*, 175.  
*Potamogeton natans*, 175.  
*Potamogeton pectinatus*, 176.  
*Potamogeton pusillus*, 176.  
*Potentilla anserina*, 102, 147.  
*Potentilla reptans*, 57, 120.  
*Potentilla Tormentilla*, 150.  
*Poterium Sanguisorba*, 117.  
*Primula veris*, 121.  
*Prunella vulgaris*, 101, 147, 161.  
*Pteris aquilina*, 125.  
  
*Ranunculus acris*, 50, 118, 154.  
*Ranunculus aquatilis*, 167.  
*Ranunculus arvensis*, 50.  
*Ranunculus bulbosus*, 117, 154.  
*Ranunculus Ficaria*, 119, 154.  
*Ranunculus Flammula*, 147, 177.  
*Ranunculus Lingua*, 177.  
*Ranunculus repens*, 51, 118, 154.  
*Ranunculus sceleratus*, 166.  
*Raphanus Raphanistrum*, 99.  
*Reseda lutea*, 86.  
*Rhinanthus major*, 113, 153.  
*Rubus fruticosus*, 115.  
*Rumex Acetosa*, 102, 147.  
*Rumex Acetosella*, 103, 147, 161.  
*Rumex conglomeratus*, 65.  
*Rumex crispus*, 64, 124, 155.  
*Rumex Hydrolapathum*, 167.  
*Rumex obtusifolius*, 64, 124, 155.  
*Rumex sanguineus*, 124.  
  
*Sagina procumbens*, 94, 159.  
*Sagittaria sagittifolia*, 165.  
*Scabiosa arvensis*, 100, 145.  
*Scabiosa Columbaria*, 145.  
*Scabiosa succisa*, 144.  
*Scandix Pecten-Veneris*, 101.  
*Schleranthus annuus*, 81.  
  
*Scirpus lacustris*, 166.  
*Scrophularia aquatica*, 169.  
*Senebiera Coronopus*, 61.  
*Senecio Jacobæa*, 142.  
*Senecio vulgaris*, 78, 134.  
*Sherardia arvensis*, 83.  
*Silene inflata*, 52, 118.  
*Sisymbrium Alliaria*, 88.  
*Sisymbrium officinale*, 88.  
*Sisymbrium Thaliana*, 61.  
*Sium angustifolium*, 173.  
*Solanum nigrum*, 90.  
*Sonchus arvensis*, 104.  
*Sonchus oleraceus*, 103.  
*Sparganium ramosum*, 166.  
*Sparganium simplex*, 166.  
*Spergula arvensis*, 107.  
*Spiræa Ulmaria*, 139.  
*Stachys arvensis*, 112.  
*Stellaria media*, 56.  
*Symphytum officinale*, 121.  
  
*Tanasetum vulgare*, 108.  
*Taraxacum vulgare*, 62, 123, 155.  
*Thalictrum flavum*, 143.  
*Thlaspi arvense*, 94.  
*Tragopogon pratensis*, 69, 128.  
*Trifolium dubium*, 162.  
*Trifolium procumbens*, 151, 162.  
*Trifolium repens*, 154.  
*Tussilago Farfara*, 57, 120.  
*Typha latifolia*, 176.  
  
*Ulex europæus*, 128.  
*Ulex nanus*, 129.  
*Urtica dioica*, 89.  
*Urtica urens*, 90.  
  
*Valerianella olitoria*, 59.  
*Veronica agrestis*, 105.  
*Veronica Anagallis*, 177.  
*Veronica arvensis*, 106.  
*Veronica Beccabunga*, 165.  
*Veronica Chamædrys*, 148.  
*Veronica hederifolia*, 105.  
*Veronica scutellata*, 177.  
*Veronica serpyllifolia*, 106.  
*Veronica Tournefortii*, 105.  
*Viola tricolor*, 92.

## INDEX II.

### LOCAL NAMES

- Adam-and-Eve, 130, 133.  
 Alkanet, 49.  
 All-heal, 101.  
 American Waterweed, 174.  
 Avens, Wood, 136.  
  
 Bachelor's Buttons, 50, 123.  
 Barley, Wild, 130, 133.  
 Bartsia, Viscid, 114.  
 Beaked Parsley, 140, 141.  
 Bearbind, 46, 47.  
 Bedstraw, Lady's, 115.  
 Bedstraw, Rough-fruited, 45.  
 Belbine, 47.  
 Bellflower, Corn, 51.  
 Bent Grass, 72, 76.  
 Billy-buttons, 52, 123.  
 Birds'-eyes, 66, 105, 106, 148.  
 Bird's-eye, Red, 96.  
 Bird's-foot Trefoil, 151, 162.  
 Bird's-nest, 53.  
 Bishop's-weed, 70.  
 Bittercress, 138.  
 Black Couch, 72.  
 Black Grass, 129.  
 Black Twitch, 72.  
 Blanket Weed, 164.  
 Bluebell, Corn, 51.  
 Bluebottle, 59.  
 Blue-tops, 144.  
 Bracken, 125.  
 Brake, 125.  
 Bramble, 115.  
 Bright-eye, 125.  
 Buck's-horn, 61.  
 Buckwheat, Climbing, 46.  
 Bugloss, Small, 49.  
 Bulrush, 176.  
 Bur-Parsley, 94.  
 Burweed, 166.  
 Buttercup, Celery-leaved, 166.  
 Buttercup, Meadow, 50.  
 Buttercup, Narrow-leaved, 147.  
 Buttercup, Water, 167.  
 Buttercup, White, 167.  
 Buxbaum's Speedwell, 105.  
  
 Cabbage, Devil's, 95.  
 Cammock, 99, 100.  
 Campion, Marsh, 142.  
 Cankerwort, 142.  
  
 Carlock, 54.  
 Cat's-eye, 105, 148.  
 Cat's-tail, 80, 176.  
 Cat's-whin, 99, 100.  
 Chalkweed, 95.  
 Chamomile, 84.  
 Chamomile, Rayless, 84.  
 Chamomile, Stinking, 84.  
 Charlock, 87, 88, 99.  
 Charlock, Jointed, 99.  
 Charlock, White, 99.  
 Chervil, Needle, 101.  
 Chervil, Wild, 141.  
 Chickweed, 100, 108.  
 Chickweed Speedwell, 105.  
 Chimney Sweeps, 152.  
 Choke Weed, 48.  
 Church Steeple, 114.  
 Clayweed, 57.  
 Cleavers, 70.  
 Cleavers, Water, 114.  
 Clover, Hop, 151, 162.  
 Clover, Suckling, 162.  
 Clover, White, 154.  
 Clubrush, 166.  
 Clustered Dock, 65.  
 Cocks-and-Hens, 97.  
 Cockle-burrs, 114.  
 Cock's-comb, 113.  
 Cocksfoot Grass, 157.  
 Codlins-and-Cream, 152.  
 Convolvulus, Large, 48.  
 Convolvulus, Small, 47.  
 Corn Bellflower, 51.  
 Cornbind, 46.  
 Corn Bluebell, 51.  
 Corn Feverfew, 84.  
 Cotton Grass, 146.  
 Cotton Weed, 61.  
 Couch, Black, 72.  
 Coughwort, 57.  
 Cow Mumble, 79, 141.  
 Cow Parsley, 141.  
 Cow Parsnip, 79.  
 Crackers, 52.  
 Crane's-bill, Large, 122.  
 Crane's-bill, Stinking, 79.  
 Creeping Cinquefoil, 57, 120.  
 Cress, Wild, 94.  
 Crocus, Autumn, 144.  
 Crowfoot, 50, 51, 117.  
 Crow's Onions, 68.

Cuckoo-flower, 52, 138, 142.  
Cudwort, 62.

Daisy, Moon, 123.  
Devil's-bit, 144.  
Dewcups, 138.  
Dock, Bloody, 124.  
Docken, 64, 65, 167.  
Dog Daisy, 84, 123.  
Dognettle, 63.  
Dog's Chamomile, 53, 54.  
Downweed, 62.  
Dutch Clover, 154.  
Dyer's Broom, 124.

Earthnut, 141.  
Euphrasy, 125.

Fat Hen, 70, 92.  
Feverfew, Corn, 84.  
Feverfew, Scentless, 84.  
Figwort, 119.  
Fiorin Grass, 74, 76.  
Five-leaves, 57.  
Flag, 170.  
Flax, Dwarf, 126.  
Flax, Fairy, 126.  
Fluellin, 111.  
Foalfoot, 57.  
Foxtail, Marsh, 130.  
Foxtail, Slender, 72.  
Furze, 128, 129.

Garden Gates, 92.  
Garkins, 134.  
Garlic, Wild, 68.  
Germander, 148.  
Germander Speedwell, 148.  
Geranium, Wild, 122.  
Geum, Wild, 136.  
Gilliflower, Sea, 162.  
Gipsies' Wild Onions, 67.  
Goatweed, 70.  
Goldy-knobs, 117.  
Goosegrass, 102.  
Goosegrass, Water, 114.  
Goosegrass, Yellow, 115.  
Gowan, 123.  
Grass, Black, 129.  
Grass, Black-headed, 152.  
Grass, Oat, 129.  
Grass, Tussock, 132.  
Gromwell, Field, 77.  
Ground Lichen, 158.  
Grunsell, 78.

Hardheads, 80, 81, 97.  
Hartshorn, 159.  
Havers, 77.  
Hawkbit, Hispid, 135.  
Hawkbit, Lesser, 157.  
Hawksbeard, Beaked, 78.  
Headaches, 98, 99.  
Heartsease, 92.  
Hedge Parsley, 141.  
Hemlock, 141.  
Hemlock Water Dropwort, 167.  
Henbit, 63.  
Herb Gerard, 70.  
Herb Peter, 121.  
Hogweed, 81.  
Hop Trefoil, 151, 162.  
Honeysuckle, Dutch, 154.  
Horse-hoof, 57.  
Horse Knobs, 80.  
Horsetail, 171.  
Horsetail, Large, 170.  
Horsetail, Mud, 169.  
Horse Pipes, 170.

Ironheads, 80.  
Iron-weed, 81.

Jack-by-the-Hedge, 88.  
Jagged Leaved Crane's-bill, 60.  
John-go-to-bed-at-noon, 69.  
Joints, 80, 169, 170.

Karloek, 54.  
Keck, 141.  
Kelks, 141.  
Ketlock, 54, 87, 88.  
Kilk, 54.  
King Cobs, 171.  
King Cups, 171.  
Knotweed, 81.  
Knotwort, 81.

Lady's Fingers, 151.  
Lady's-hair, 132.  
Lamb's Lettuce, 59.  
Lamb's-tongue, 97.  
Liquorice, Wild, 99, 100.  
Ling, 136.  
Liverwort, Ground, 158.

Marguerite, Wild, 123.  
Marigold, Wild, 83.  
Matfellow, 81.  
Matgrass, Moor, 130.  
Matweed, 130.

- Mayweed, 54.  
 Milfoil, 153.  
 Milkmaids, 138.  
 Milkweed, 103, 104, 106, 107.  
 Mint, Horse, 172.  
 Moon Daisy, 123.  
 Moor Grass, 130.  
 Morning Glory, 48.  
 Mouse-ear Chickweed, 57, 120, 154.  
 Mouse-ears, 57, 135.  
 Mugweed, 87.  
 Mustard, Wild, 54, 87.  
  
 Naked Ladies, 144.  
 Nettle, Stinging, 89.  
 Nightshade, Garden, 90.  
 Nonsuch, 85.  
 Nosebleed, 153.  
  
 Oat, Bearded, 77.  
 Oat, Wild, 77, 129.  
 Oilseed, 69.  
 Old-man's-beard, 120.  
 One-o'-clocks, 62.  
 Onions, Crow's, 68.  
 Onions, Wild, 68.  
 Orache, Wild, 92.  
  
 Paddock Pipes, 169.  
 Paigle, 121.  
 Parsley, Cow, 141.  
 Parsley, False, 93.  
 Parsley, Knotted Hedge, 93.  
 Parsley Piert, 82.  
 Parsnip, Cow, 79.  
 Peterwort, 121.  
 Pilewort, 119.  
 Pimpinella, 117.  
 Pincushion, 100.  
 Pink, Sea, 162.  
 Pipperidge, 45.  
 Piprage, 45.  
 Plantain, Star, 159.  
 Pondweed, Canadian, 174.  
 Pondweed, Floating, 175.  
 Poor-Man's-Weather-Glass, 96.  
 Poppy, Pale, 99.  
 Poppy, Wild, 98, 99.  
 Prunella, Wild, 101.  
 Purging Flax, 126.  
  
 Quacker Ducks, 132.  
 Quaker Grass, 132.  
 Queen-of-the-Meadows, 139.  
 Quitch, 73.  
  
 Ragweed, 142.  
 Ramsons, 67.  
 Rat's-tail, 97.  
 Rattle, Red, 45.  
 Rayless Chamomile, 84.  
 Rayless Mayweed, 84.  
 Red Rattle, 138.  
 Red Robin, 52.  
 Rennet-weed, 115.  
 Rhubarb, Wild, 117.  
 Rocket, Base, 86.  
 Rose, Corn, 98, 99.  
 Runch, 54, 87, 99.  
  
 Sauce-alone, 88.  
 Scorpion Grass, 66.  
 Scratchgrass, 70.  
 Scum, 164.  
 Sheep's-bit, 145.  
 Sheep's Sorrel, 103, 147.  
 Sicklewort, 116.  
 Slime, 164.  
 Smokeweed, 67.  
 Snapdragon, Yellow, 112.  
 Sneezewort, 153.  
 Speedwell, 105, 165.  
 Speedwell, Buxbaum's, 105.  
 Speedwell, Corn, 106.  
 Spinach, Wild, 69, 70.  
 Spiræa, Wild, 139.  
 Spurwort, 83.  
 Squirrel's Tail, 130, 133.  
 Squitch, 73.  
 Stoneweed, 81.  
 Sour Dock, 102, 103.  
 St. James' Wort, 142.  
 Strangle-weed, 48, 65.  
 Star Plantain, 159.  
 Starweed, 159.  
 Succory, 55.  
 Swine's Cress, 61.  
  
 Tansy, Wild, 102.  
 Thale Cress, 61.  
 Thanet Weed, 95.  
 Thistle, Cotton, 110.  
 Thistle, Field, 108.  
 Thistle, Ground, 148.  
 Thistle, Milk, 103, 104.  
 Thistle, Nodding, 110.  
 Thistle, Scottish, 110.  
 Thistle, Stemless, 148.  
 Thrincia, 157.  
 Thyme, Water, 174.  
 Toadstools, 127, 155.

- Tom Thumbs, 151.  
Traveller's Joy, 120.  
Trefoil, 85.  
Tussock Grass, 132.  
Twitch, 73, 74, 76.  
Twitch, Black, 72.  
  
Venus' Comb, 101.  
Venus' Looking-glass, 51.  
  
Wart Cress, 61.  
Wart Plant, 106, 107.  
Water Dropwort, 167.  
Water-lilies, 167.  
Water Thyme, 174.  
Waterweed, American, 174.  
Waybent, 130, 133.  
Waybread, 97.  
Wheat, Creeping, 73.  
Whin, 99, 100, 128, 129.  
White Birds'-eyes, 56.  
  
White-bottle, 52.  
White Robin, 52.  
Whitlow-grass, Vernal, 112.  
Whitlow Peppermint, 95.  
Whiterot, 141.  
White Weed, 95.  
Wild Garlic, 68.  
Wild Geranium, 60, 122.  
Wild Mustard, 54, 87.  
Wild Onions, 68.  
Wild Spinach, 69, 70.  
Willow-weed, 96.  
Woodwax, 124.  
Wood Avens, 136.  
Wormwood, Wild, 87.  
Woundwort, Field, 112.  
  
Yellow Ox-eye, 83.  
Yellow-weed, 86.  
Yorkshire Fog, 129, 131.



# INDEX III.

## POPULAR NAMES.

(See also INDEX II.)

- Agrimony, Common, 114.  
 Algæ, 164.  
 Arrowhead, 165.  
 Barberry, Common, 45.  
 Bartsia, Red, 45, 114.  
 Bartsia, Yellow, 114.  
 Bedstraw, Corn, 45.  
 Bedstraw, Water, 114.  
 Bedstraw, Yellow, 115, 154.  
 Bindweed, Black, 46.  
 Bindweed, Common, 47, 115, 154.  
 Bindweed, Great, 48.  
 Bittercress, Hairy, 48.  
 Bittercress, Waved, 48.  
 Blackberry, Common, 115.  
 Brooklime, 165.  
 Broom, Common, 116.  
 Broomrape, Lesser, 48.  
 Bugle, Common, 116.  
 Bugloss, Field, 49.  
 Bugloss, Viper's, 49.  
 Bulrush, 166.  
 Burdock, Common, 116.  
 Burnet, Salad, 117.  
 Bur-reed, Branched, 166.  
 Bur-reed, Unbranched, 166.  
 Butterbur, Common, 117.  
 Buttercup, Bulbous, 117, 154.  
 Buttercup, Common, 50, 118, 154.  
 Buttercup, Corn, 50.  
 Buttercup, Creeping, 51, 118, 154.  
 Campanula, Corn, 51.  
 Campion, Bladder, 52, 118.  
 Campion, Red, 52, 118.  
 Campion, White, 52, 118.  
 Candytuft, Common, 53.  
 Carrot, Wild, 53, 119.  
 Cat's-ear, Long-rooted, 119, 154.  
 Celandine, Lesser, 119, 154.  
 Centuary, Common, 120.  
 Chamomile, Corn, 53.  
 Chamomile, Wild, 54.  
 Charlock, Common, 54.  
 Chicory, Wild, 55.  
 Chickweed, Common, 56.  
 Chickweed, Mouse-ear, 57, 120, 154.  
 Cinquefoil, Creeping, 57, 120.  
 Clematis, Wild, 120.  
 Clover, Dutch, 154.  
 Coltsfoot, Common, 57, 120.  
 Comfrey, Common, 121.  
 Corn Cockle, Common, 58.  
 Cornflower, Common, 59.  
 Corn Salad, Common, 59.  
 Cowslip, Common, 121.  
 Cow-wheat, Common, 121.  
 Cow-wheat, Purple, 59.  
 Crane's-bill, Cut-leaved, 60, 121.  
 Crane's-bill, Dove's-foot, 60, 122.  
 Crane's-bill, Meadow, 122.  
 Crane's-bill, Small, 60.  
 Cress, Common Swine's, 61.  
 Cress, Thale, 61.  
 Crowfoot, Celery-leaved, 166.  
 Crowfoot, Water, 167.  
 Cudweed, Marsh, 61, 123.  
 Cudweed, Upright, 62.  
 Daisy, Common, 123, 155.  
 Daisy, Ox-eye, 123.  
 Dandelion, Common, 62, 123, 155.  
 Deadnettle, Henbit, 63.  
 Deadnettle, Red, 63.  
 Deadnettle, White, 63.  
 Dock, Broad-leaved, 64, 124, 155.  
 Dock, Curled, 64, 124, 155.  
 Dock, Great Water, 167.  
 Dock, Red-veined, 124.  
 Dock, Sharp, 65.  
 Dodder, Clover, 65, 124.  
 Dropwort, Water, 167.  
 Duckweed, Common, 168.  
 Duckweed, Great, 168.  
 Duckweed, Ivy-leaved, 168.  
 Dyer's Green-weed, 124.  
 Eyebright, Common, 125.  
 Fairy Rings, 155.  
 Fern, Bracken, 125.  
 Figwort, Water, 169.  
 Flax, Purging, 126.  
 Forget-me-not, Field, 66.  
 Forget-me-not, Yellow and Blue, 66.  
 Fumitory, Common, 67.  
 Fungi, 127, 155.

- Garlic, Broad-leaved, 67, 127.  
 Garlic, Crow, 68, 127.  
 Garlic, Field, 68.  
 Gentian, Field, 128.  
 Goatsbeard, Common, 69, 128.  
 Gold of Pleasure, 69.  
 Goosefoot, Red, 69.  
 Goosefoot, White, 70.  
 Goosegrass, Common, 70.  
 Gorse, Common, 128.  
 Gorse, Dwarf, 129.  
 Goutweed, 70, 129.  
 Grass, Annual Meadow, 72.  
 Grass, Barren Brome, 129.  
 Grass, Black Bent, 72.  
 Grass, Cocksfoot, 157.  
 Grass, Common Bent, 72, 129, 157.  
 Grass, Couch, 73, 129, 157.  
 Grass, Creeping Bent, 74.  
 Grass, Creeping Soft, 129.  
 Grass, Darnel, 74.  
 Grass, False Oat, 75.  
 Grass, Field Brome, 75.  
 Grass, Floating Foxtail, 130, 169.  
 Grass, Mat, 130.  
 Grass, Meadow Barley, 130.  
 Grass, Meadow Soft, 131, 157.  
 Grass, Onion Couch, 76.  
 Grass, Quaking, 132.  
 Grass, Rye Brome, 76.  
 Grass, Smooth Brome, 76.  
 Grass, Soft Brome, 132.  
 Grass, Tufted Hair, 132.  
 Grass, Wall Barley, 133.  
 Grass, Waved Hair, 133.  
 Grass, White Bent, 76, 134.  
 Grass, Wild Oat, 77.  
 Gromwell, Corn, 77.  
 Groundsel, Common, 78, 134.  
 Hawkbit, Autumnal, 134.  
 Hawkbit, Hairy, 157.  
 Hawkbit, Rough, 135.  
 Hawksbeard, Dandelion-leaved, 78, 135.  
 Hawksbeard, Smooth, 78, 135.  
 Hawkweed, Mouse-ear, 135, 157.  
 Heath, Cross-leaved, 135.  
 Heather, Common, 136.  
 Hemp Agrimony, 169.  
 Hemp-nettle, Common, 79.  
 Herb Bennet, 136.  
 Herb Robert, 79.  
 Hogweed, Common, 79, 136.  
 Hop, Common, 137.  
 Horsetail, Bog, 169.  
 Horsetail, Field, 80, 137.  
 Horsetail, Great Water, 170.  
 Iris, Yellow, 170.  
 Knapweed, Black, 80, 137.  
 Knapweed, Greater, 81, 137.  
 Knawel, Annual, 81.  
 Knotgrass, Common, 81, 158.  
 Lady's Mantle, Common, 138.  
 Lady's Mantle, Field, 82.  
 Lady's Smock, 138.  
 Lichen, Ground, 158.  
 Loosetrife, Purple, 170.  
 Lousewort, Common, 138.  
 Lousewort, Marsh, 138.  
 Madder, Field, 83.  
 Maretail, 171.  
 Marigold, Corn, 83.  
 Marigold, Marsh, 171.  
 Marshwort, 171.  
 Mayweed, Rayless, 84.  
 Mayweed, Scentless, 84.  
 Mayweed, Stinking, 84.  
 Meadowsweet, 139.  
 Medick, Black, 85, 139, 159.  
 Mercury, Annual, 85.  
 Mignonette, Wild, 86.  
 Milfoil, Water, 171.  
 Milkwort, Common, 139.  
 Mint, Corn, 86.  
 Mint, Water, 172.  
 Mosses, 139, 159.  
 Mousetail, Common, 86.  
 Mugwort, 87.  
 Mustard, Black, 87.  
 Mustard, Garlic, 88.  
 Mustard, Hedge, 88.  
 Mustard, White, 88.  
 Nettle, Common, 89, 140.  
 Nettle, Small, 90, 140.  
 Nightshade, Black, 90.  
 Nipplewort, Common, 91.  
 Orache, Halberd-leaved, 92.  
 Orache, Spreading, 92.  
 Orchis, Spotted, 140.  
 Pansy, Field, 92.  
 Parsley, Common Beaked, 140.  
 Parsley, Corn, 93.

- Parsley Fool's, 93.  
 Parsley, Knotted Bur, 93.  
 Parsley, Spreading Hedge, 94.  
 Parsley, Upright Hedge, 141.  
 Parsley, Wild Beaked, 141.  
 Parsnip, Water, 173.  
 Pearlwort, Common, 94 159.  
 Penny-Cress, Common, 94.  
 Pennywort, Marsh, 141.  
 Pepperwort, Field, 95.  
 Pepperwort, Hoary, 95.  
 Persicaria, Spotted, 96.  
 Pignut, Common, 141.  
 Pimpernel, Scarlet, 96.  
 Plantain, Buck's Horn, 159.  
 Plantain, Common Water, 173.  
 Plantain, Greater, 97, 142, 160.  
 Plantain, Hoary, 97, 142, 161.  
 Plantain, Lesser Water, 174.  
 Plantain, Ribwort, 97, 142, 161.  
 Plantain, Sea, 161.  
 Pondweed, American, 174.  
 Pondweed, Broad-leaved, 175.  
 Pondweed, Curly, 175.  
 Pondweed, Fennel-leaved, 176.  
 Pondweed, Small, 176.  
 Poppy, Corn, 98.  
 Poppy, Long-headed, 98.  
 Poppy, Rough-headed, 99.  
  
 Radish, Wild, 99.  
 Ragged Robin, 142.  
 Ragwort, Common, 42.  
 Reed, Common, 176.  
 Reedmace, 176.  
 Rest-harrow, Common, 99, 143.  
 Rest-harrow, Spiny, 100, 143.  
 Rue, Meadow, 143.  
 Rushes, 143, 161, 177.  
  
 Saffron, Meadow, 144.  
 Sandwort, Thyme-leaved, 100.  
 Scabious, Devil's-bit, 144.  
 Scabious, Field, 100, 145.  
 Scabious, Sheep's, 145.  
 Scabious, Small, 145.  
 Sedge, 146, 177.  
 Sedge, Cotton, 146.  
 Sedge, Hare's-tail Cotton, 146.  
 Self-heal, Common, 101, 147, 161.  
 Shepherd's Needle, 101.  
 Shepherd's Purse, 101, 161.  
 Silverweed, Common, 102, 147.  
  
 Sorrel, Common, 102, 147, 161.  
 Sorrel, Sheep's, 103, 147.  
 Sowthistle, Common, 103.  
 Sowthistle, Corn, 104.  
 Spearwort, Greater, 177.  
 Spearwort, Lesser, 147, 177.  
 Speedwell, Field, 105.  
 Speedwell, Germander, 148.  
 Speedwell, Ivy-leaved, 105.  
 Speedwell, Large Field, 105.  
 Speedwell, Marsh, 177.  
 Speedwell, Thyme-leaved, 106.  
 Speedwell, Wall, 106.  
 Speedwell, Water, 177.  
 Spurge, Caper, 106.  
 Spurge, Dwarf, 106.  
 Spurge, Petty, 107.  
 Spurge, Sun, 107.  
 Spurrey, Corn, 107.  
 Starwort, Water, 178.  
 Stork's-bill, Hemlock, 108.  
  
 Tansy, Common, 108.  
 Teazle, Wild, 148.  
 Thistle, Carline, 148.  
 Thistle, Creeping, 108, 148, 161.  
 Thistle, Dwarf, 148, 161.  
 Thistle, Marsh, 149.  
 Thistle, Musk, 110, 149.  
 Thistle, Scotch, 110, 149.  
 Thistle, Spear, 110, 149, 161.  
 Thistle, Welled, 110, 149, 161.  
 Thrift, Common, 162.  
 Toadflax, Round-leaved, 111.  
 Toadflax, Sharp-pointed, 111.  
 Toadflax, Yellow, 112.  
 Tormentil, 150.  
 Trefoil, Bird's-foot, 151, 162.  
 Trefoil, Hop, 151, 162.  
 Trefoil, Yellow, 162.  
  
 Water-lily, White, 178.  
 Water-lily, Yellow, 178.  
 Whitlow-grass, Common, 112.  
 Willowherb, Great Hairy, 152, 179.  
 Willowherb, Small-flowered, 152.  
 Woodrush, Field, 152, 162.  
 Woundwort, Corn, 112.  
  
 Yarrow, Common, 153, 162.  
 Yellow Rattle, Common, 153.  
 Yellow Rattle, Great, 113.

















